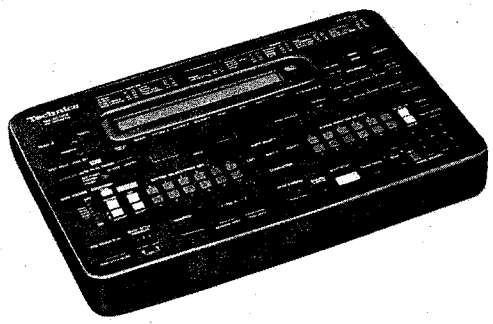
ORDER NO. EMID941537
A5

Service Manual

MIDI ORCHESTRA

SM-AC1200

(M), (MC), (XM), (EN), (EH), (EF), (EZ), (EW), (EA), (EP), (EK), (XL), (XR), (XS), (XD), (X), (XT)



AREAS

(M):	U.S.A.	(EK):	the United Kingdom
(MC):	Canada	(XL):	New Zealand
(XM):	Mexico	(XR):	Australia
(EN):	Norway, Sweden, Denmark, Finland	(XS):	Malaysia, Singapore, South Africa
(EH):	Holland, Belgium	(XD):	Saudi Arabia, Kuwait
(EF):	France, Italy	(X):	the Middle East, Indonesia, Hong Kong, the Philippines, Thailand
(EZ):	Germany		
(EW):	Switzerland		
(EA):	Austria		
(EP):	Spain, Portugal, Greece, Russia	(XT):	Taiwan

⚠ WARNING

This service infomation is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service infomation by anyone else could result in serious injury or death.

■ Specifications

SOUND GENERATOR	PCM
MAXIMUM NUMBER OF NOTES PRODUCED SIMULTANEOUSLY	32 NOTES
SOUNDS	200 SOUNDS
EFFECTS	DIGITAL EFFECT, SUSTAIN, DIGITAL REVERB
PART SELECT	RIGHT 1, RIGHT 2, LEFT
TRANSPOSE	G-C-F#
RHYTHM	100 RHYTHMS
CONTROLS	MAIN VOLUME, OTHER BALANCE, CONDUCTOR, START/STOP, INTRO & ENDING, FILL IN 1, FILL IN 2, VARIATION, COUNT INTRO , SYNCHRO & BREAK, TEMPO, SPLIT POINT, MUTE
AUTO PLAY CHORD	ONE FINGER, FINGERED, PIANIST, MEMORY, ON BASS, MUSIC STYLE ARRANGER, SOUND ARRANGER
ONE TOUCH PLAY	○ (ONE TOUCH PLAY/MUSIC STYLE SELECT)
TECHNI-CHORD	○
PANEL MEMORY	2 BANKS × 8, SET
SEQUENCER	16 TRACKS STORAGE CAPACITY : APPROX. 19000 NOTES INPUT MODES : EASY RECORD, REALTIME RECORD, STEP RECORD FUNCTIONS : TRACK ASSIGN, EDIT (SONG CLEAR, TRACK CLEAR, VELOCITY CHANGE, QUANTIZE, TRACK MERGE, MEASURE ERASE, MEASURE COPY, MESURE INSERT, MEASURE DELETE), PUNCH RECORD, PLAY, MEDLEY
COMPOSER	5 PARTS : BASS, ACCOMP 1, ACCOMP 2, ACCOMP 3, DRUMS STORAGE CAPACITY : APPROX. 8600 NOTES INPUT MODES : REALTIME RECORD, STEP RECORD FUNCTIONS : COMPOSER LOAD, CLEAR, MODE SELECT, COPY, LOAD SINGLE COMPOSER PATTERN MEMORY : 2 BANKS × 10 (MEMORY 1–6, INTRO, FILL IN 1, FILL IN 2, ENDING)
DISK DRIVE	3.5 INCH DISK DRIVE FOR 2HD (1.44 MB), 2DD (720 KB) DISK LOAD, DISK SAVE, MIDI FILE LOAD, MIDI FILE SAVE, DISK FORMAT, LOAD SINGLE COMPOSER PATTERN, LOAD SINGLE SOUND MEMORY
SOUND SETTING	PART SETTING (VOLUME, SUSTAIN, PAN, KEY SHIFT, TUNE, PITCH BEND RANGE, GLIDE SETTING), TUNING, TECHNI-CHORD TYPE, LEFT HOLD, REVERB

Technics

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SOUND EDIT	EASY EDIT, GENERAL EDIT (OCTAVE SHIFT, VIBRATO, AUTOBEND, REVERB), TONE EDIT (TONE, LEVEL & PITCH, ENVELOPE, FILTER), EFFECT EDIT MEMORY : 36
MODE SET	INITIAL, FOOT SWITCH SETTING, LCD CONTRAST, MIDI BASIC CHANNEL, MIDI OTHER SETTINGS, MIDI PRESETS, GM MODE SET, BULK DUMP
DISPLAY	LCD (40 CHARACTERS× 2 LINES) EXIT, DISPLAY HOLD
DEMO	○
TERMINALS	DC IN 10 V, PHONES, LINE OUT (R/R+L, L), FOOT SW, EXP PEDAL, FOOT CONTROLLER 1, 2, MIDI (IN, OUT, THRU)
POWER REQUIREMENT	AC : WITH SY-AD8 AC ADAPTOR AC 120/220/230/240 V 50/60 Hz AC 120 V 60Hz (NORTH AMERICA AND MEXICO)
DIMENSIONS (W × H × D)	36.8 cm × 7.0 cm × 25.0 cm (14-1/2" × 2-3/4" × 9-27/32")
NET WEIGHT	2.1 Kg (1.0 lbs.) WITHOUT AC ADAPTOR
ACCESSORIES	AC ADAPTOR, RHYTHM PATTERN DISK

*Specification are subject to change without notice for further improvement.

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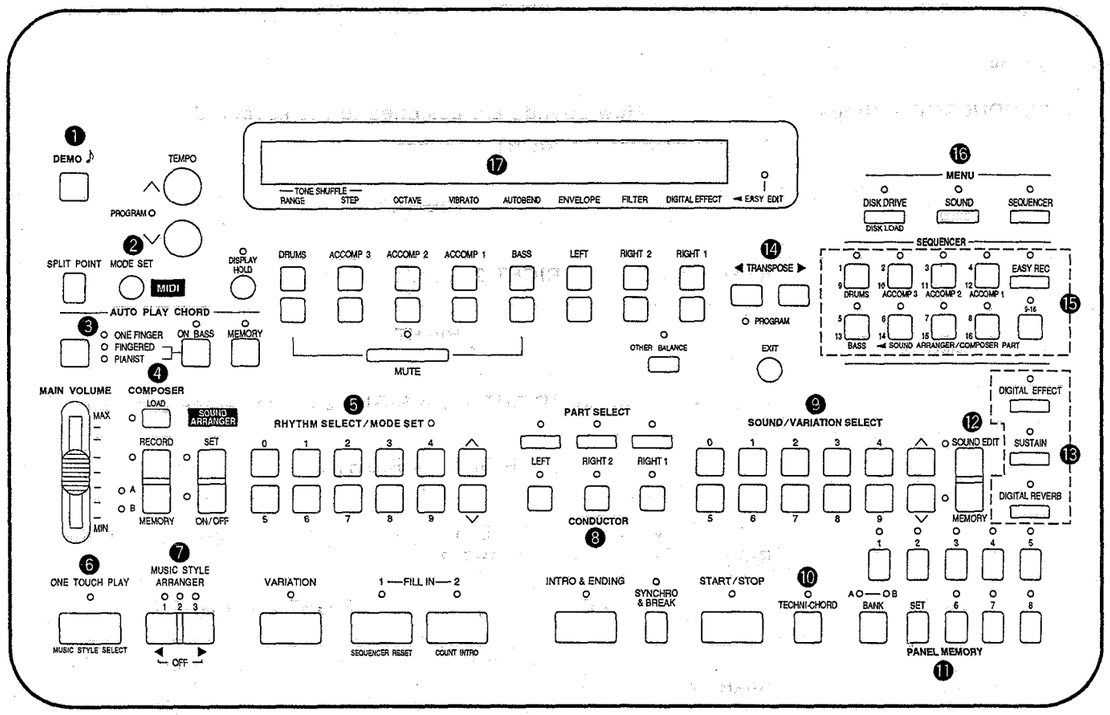
ARRANGEMENT OF CONTROL PANEL



❶ DEMO
Pre-recorded performances are used to demonstrate the individual appear of the rhythms, sounds and other features.

❷ MODE SET
The settable functions in this mode include initialization, foot switch function-assignment, and setting related to MIDI operation.

❸ AUTO PLAY CHORD
This feature is activated when the **ONE FINGER, FINGERED** or **PIANIST** button is turned on. An automatic accompaniment appropriate for the selected rhythm is produced when you play a chord. **MEMORY** allows you to continue the accompaniment even after the chord keys are released. The volume for each part of the **AUTO PLAY CHORD** (**DRUMS, BASS, ACCOMP 1, 2, 3**) is adjusted with the respective balance buttons below the display.

❹ COMPOSER
Create original rhythm patterns, either in realtime or with the step record method, or modify preset rhythms. Store up to 12 new rhythms in the reserved memory locations and recall them as you play, just like the preset rhythms.

❺ RHYTHM SELECT
Various rhythm patterns are stored in the instrument's memory. Other rhythm controls are **START/STOP, SYNCHRO & BREAK, INTRO & ENDING, VARIATION, COUNT INTRO** and **FILL IN 1** and **2**. The volume is adjusted with the **DRUMS** balance buttons below thedisplay.

❻ ONE TOUCH PLAY
Select a rhythm and press the **ONE TOUCH PLAY** button until the panel settings change. The sounds and effects perfect for the selected rhythm are automatically set in seconds. Or press the **ONE TOUCH PLAY** button briefly to access the MUSIC STYLE SELECT display. Choose one of the many music styles and the appropriate sounds, effects and even rhythm are set instantly.

❼ MUSIC STYLE ARRANGER
A tap of a button during your performance changes the rhythm and sounds to a simpler or flashier arrangement to match the feeling of the music.

❽ CONDUCTOR
These buttons allow you to assign a different sound to each part, and then assign the desired part to the entire keyboard, assign a different part to each section of the keyboard, or mix parts. When the keyboard is divided into sections, change the dividing point with the **SPLIT POINT** button.

❾ SOUND/VARIATION SELECT
Various sounds are stored in the instrument's memory.

❿ TECHNI-CHORD
Chord notes played on the left section of the keyboard are added to melody notes played on the right section.

⓫ PANEL MEMORY
Set up the sounds and effects, and then store them in these 16 memories (2 BANKS × 8 memory locations) buttons for instant recall as you play. You can expand the range of storable settings to include the rhythm selection, tempo setting and more.

⓬ SOUND EDIT
Modify preset sounds to create new and unique sounds.

⓭ Effects
Turn the **DIGITAL REVERB** button on to add reverberation to the sound. **DIGITAL EFFECT** gives the sound a thickness and diffusion. When **SUSTAIN** is on, the musical tones fade gradually after the keys are released.

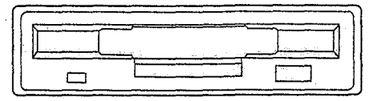
⓮ TRANSPOSE
C is the standard setting, but you can raise or lower the key of the entire instrument with these two buttons. The transposed key is shown on the normal performance display.

⓯ SEQUENCER
With this feature you can separately play and record the parts for an entire song. Then have the whole ensemble performance played back automatically. This is a true 16-track sequencer, with full realtime recording, step recording and editing features.

⓰ SOUND
This button is used for making the various sound, volume and effect settings for each part, as well as tuning and **TECHNI-CHORD** type, by reading the display.

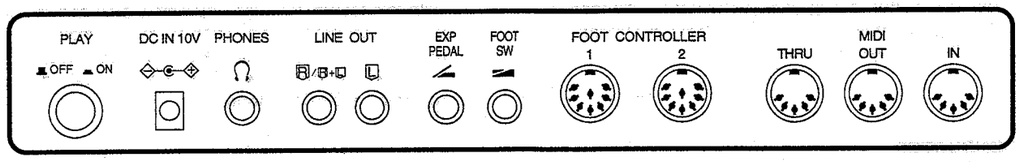
⓱ DISPLAY
Displays performance information, function settings and other messages.

● DISK DRIVE
This Disk Drive allows you to store up to 20 **SEQUENCER** performances and other data on 3.5-in. 2DD or 2HD memory disk.



TERMINALS

(on the rear panel)



DC IN (10V)
Standard household current can be used by connecting included AC adaptor between a wall outlet and the DC IN 10V terminal on the instrument.

· Use of a different AC adaptor may damage this instrument.

PHONES ( ) (Use headphone with over 16 Ω impedance.)
For silent practice headphones may be used.

LINE OUT (output level 1 Vrms, 600 Ω)
By connecting an external high-power amplifier, the sound can be reproduced at a high volume. To output monaural sound, connect the external equipment to the **R/R+L** terminal. (Do not connect the **L** terminal.)

EXP PEDAL
The optional SZ-E2 Expression Pedal can be connected to this terminal to control the volume.

FOOT SW
The optional SZ-P1 Foot Switch can be connected to this terminal to control various functions.

FOOT CONTROLLER 1, 2
When an optional SZ-FC2 Foot Controller is connected to this terminal, various functions can be controlled by the pedals.

MIDI (Musical Instrument Digital Interface)
MIDI is the standard specification that enables connection to equipment such as keyboards and personal computers. Data transmission and reception are possible between the Technics instrument and other instruments provided with MIDI terminals.

IN : The terminal that receives data from external equipment.

OUT : The terminal that transmits data from this instrument to external equipment.

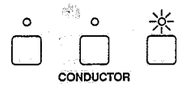
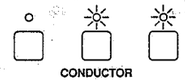
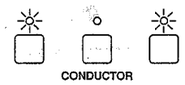
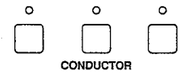
THRU: The terminal that transfers data from the **IN** terminal directly to other equipment.

• Use a 5-pin DIN cord (less than 15 m long) for these connections.

CONDUCTOR SETTINGS

The **CONDUCTOR** buttons are used to assign sounds to the keyboard of the connected instrument in many different ways. For example, you can assign two sounds to the entire keyboard so that playing one key will produce two sounds. You can even split the keyboard into right and left sections (SPLIT), and assign a different sound to each section.

CONDUCTOR

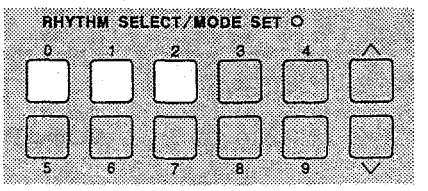
CONDUCTOR settings	How sounds are assigned to the keyboard
	All keys produce the **RIGHT 1** sounds. **RIGHT 1**
	All keys produce the **RIGHT 2** sounds. **RIGHT 2**
	All the keys play both **RIGHT 1** and **RIGHT 2** sounds at the same time. **RIGHT 1 + RIGHT 2**
	The left keys produce the **LEFT** sound and the right keys produce the **RIGHT 1** sound and the **RIGHT 2** sound (SPLIT). **LEFT** / **RIGHT 1 + RIGHT 2**
	The left keys produce the **LEFT** sound and the right keys produce the **RIGHT 1** sound (SPLIT). **LEFT** / **RIGHT 1**
	The left keys produce the **LEFT** sound and the right keys produce the **RIGHT 2** sound (SPLIT). **LEFT** / **RIGHT 2**
	The **RIGHT 1**, **RIGHT 2** and **LEFT** sounds are not produced. • Use this setting when you wish to use this instrument to produce rhythms (including automatic accompaniment) only.

INITIAL SETTING

■The initial setting function is used to return to the original factory settings, and to reset the customer settings and misoperations.

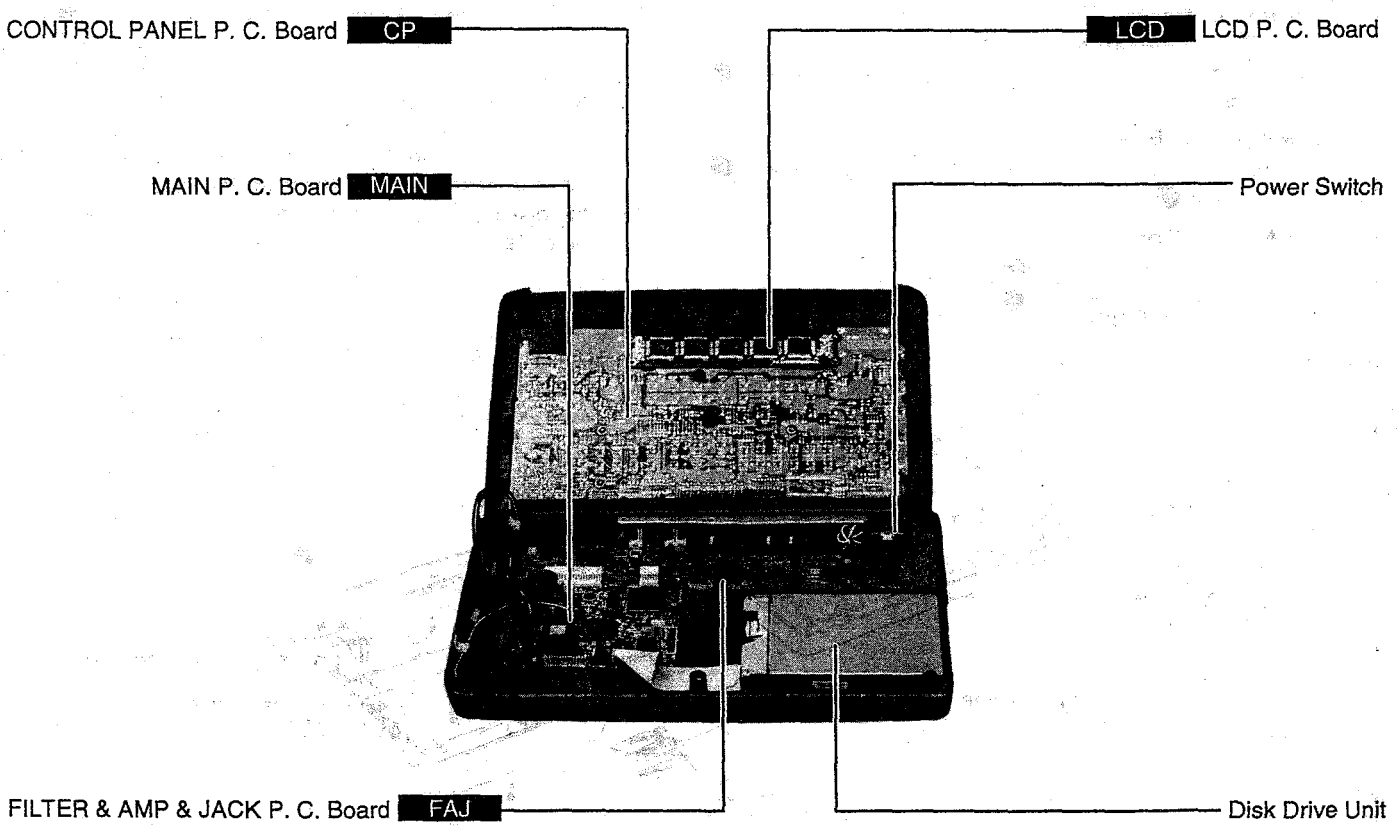
1. Press the **PLAY** button to turn off the instrument.

2. While pressing the **0,1** and **2** buttons on the **RHYTHM SELECT** number pad at the same time, turn the **PLAY** button on again.



NOTE:
All stored data in the **SEQUENCER** and **COMPOSER** and other setting are initialized with this operation.

PARTS LOCATION

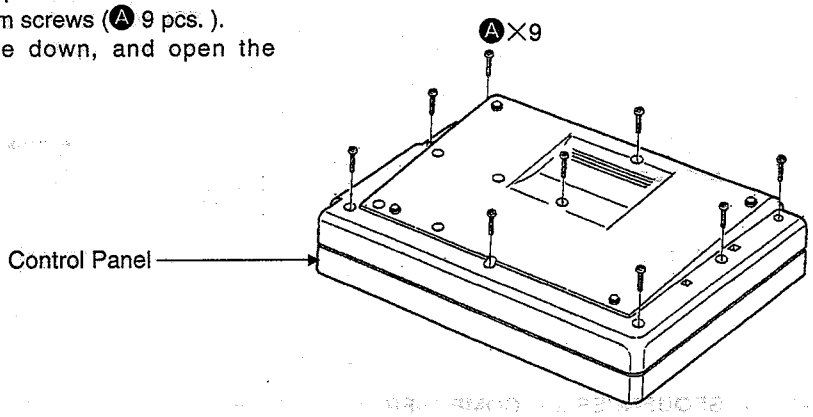


[Photo-1]

DISASSEMBLY INSTRUCTIONS

1 Opening the control panel

1. Turn the unit control panel upside down as shown in Fig. 1, and remove the bottom screws (Ⓐ 9 pcs.).
2. Place the unit bottomside down, and open the control panel.



[Fig. 1]

2 Removing the printed circuit boards and disk drive unit

• Open the control panel (see step 1).

CP P. C. Board

1. Pull off the **MAIN VOLUME** knob.
2. Remove the CP P. C. Board mounting screws (Ⓑ 6 pcs.).

MAIN P. C. Board

• Remove the MAIN P. C. Board mounting screws (Ⓒ 2 pcs. and Ⓓ 2 pcs.).

FAJ P. C. Board

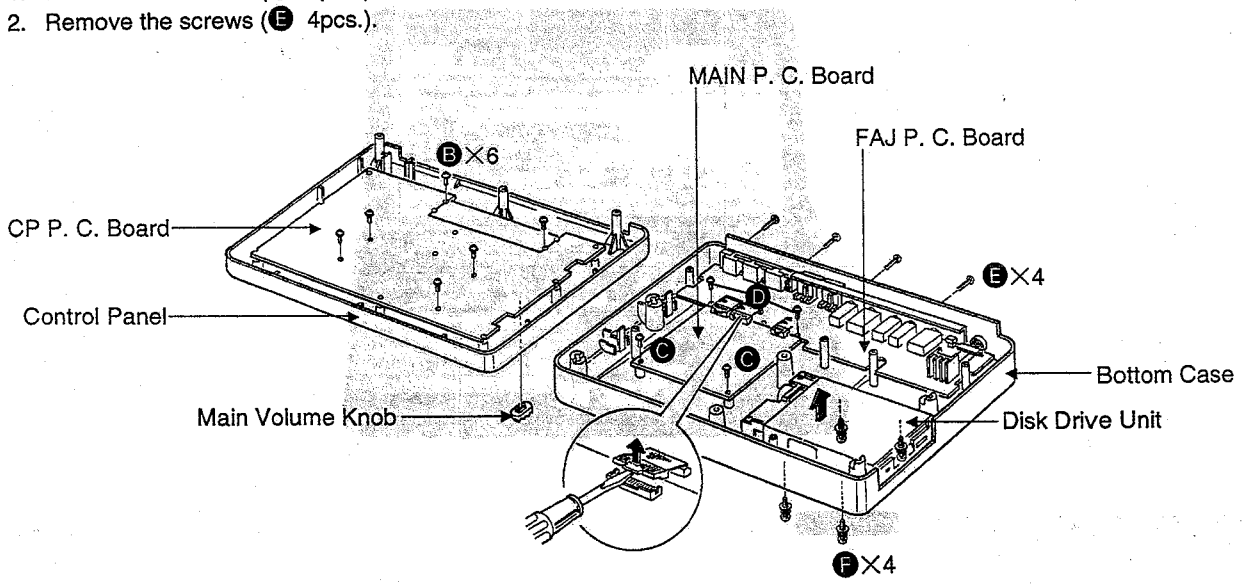
1. Remove the screws (Ⓓ 2pcs.).
2. Remove the screws (Ⓔ 4pcs.).

Disk Drive Unit

• Remove the Disk Drive Unit mounting screws (Ⓕ 4 pcs.).

NOTE:

When affixing the disk drive unit, be sure to tighten the screws in the order indicated by the numbers carved into the bottom case. Otherwise the screw holes on the disk drive and those on the bottom case may not be correctly aligned.



[Fig. 2]

ERROR DISPLAY

No.	Contents
00	The data on the disk that you are using is for a different product.
01	An error has occurred while the disk was loading. Please try again!
02	There is no disk in the Disk Drive.
03	The file that you tried to load is empty.
05	An error has occurred while the disk was saving. Please try again!
06	The disk that you are using is write protected. Please remove the write protection and try again.
07	The disk that you are using is full. Please use another disk.
08	An error has occurred while the disk was formatting. The disk that you are using may be faulty. Please try formatting another disk.
09	The data on the disk is copy protected.
10	The data is already copy protected.
11	The password that you entered is incorrect.
20	A problem has occurred with your **SEQUENCER** Data. This might be due to a damaged or faulty disk.
21	Memory full
22	It is necessary to press PUNCH OUT to complete this procedure.
23	It is impossible to change the time signature because it has already been set in the existing tracks.
24	A rhythm track already exists. It is impossible to assign two tracks to rhythm.
25	It is only possible to change the velocity on a melody track.
26	It is only possible to merge melody tracks. Tracks such as rhythm, chord and control cannot be merged.
27	It is only possible to copy melody tracks. Tracks such as rhythm, chord and control cannot be copied.

No.	Contents
28	This song is too long to be saved as a MIDI file.
29	The MIDI file that you have tried to load exceeds the memory capacity of the AC1200 and cannot be played. The **SEQUENCER** memory has been cleared.
30	It is not possible to change the time signature or measure length of a **COMPOSER** pattern after it has been recorded. If you want to proceed, you must first clear the entire **COMPOSER** pattern.
31	The time signature of the pattern from which you are copying is different from the **COMPOSER** memory that you are using. Either: Change the time signature of the **COMPOSER** memory or: Copy from a pattern that has the same time signature
32	Memory full
40	The Identification (ID) code of the system exclusive data received by the AC1200 is for a different product.
41	An error has occurred during system exclusive data reception. The data from the transmitting device may be incomplete. Please try again.
42	An error has occurred during system exclusive transmission. The data has not been received correctly. Please try again.
43	The file that you are trying to load was saved on a previous KN Keyboard. It is only possible to load using the "ALL" option.
44	It is impossible to edit a Drum Kit. Please select a different sound from any group except Keyboard Percussion.
45	Incompatible disk format.
46	It is only possible to insert melody tracks.
47	Please select a preset pattern (**00–99**).

SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE

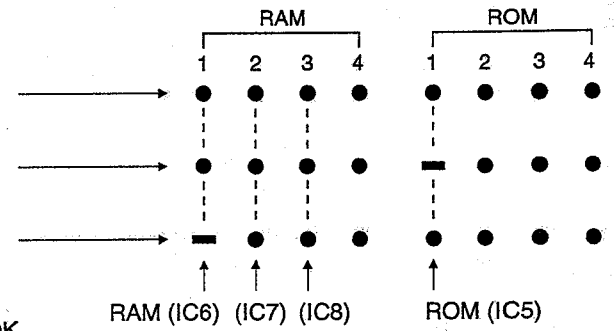
The following changes in performance may occur in Technics Keyboard but do not indicate trouble.

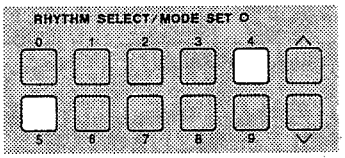
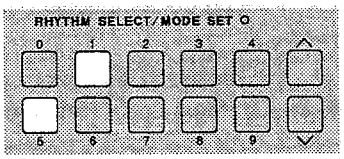
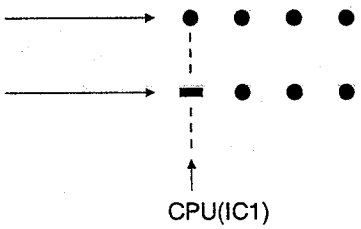
	Phenomenon	Remedy
Sounds and effects	The buttons and keys of the connected instrument, etc. malfunction.	• Turn off the **PLAY** button once, then turn it on again. If this procedure is not successful, turn off the **PLAY** button once. Then, while pressing the three lower number buttons in the **RHYTHM SELECT** number pad (**0**, **1** and **2**) at the same time, turn the **PLAY** button on again. (Note that, in this case, all programmable settings, functions and memories return to their factory-preset status.)
	No sound is produced when the keys of the connected instrument are pressed.	• The **MAIN VOLUME** is at the minimum setting. Adjust the volume with the **MAIN VOLUME** control. • The MIDI channel assignment of this instrument and the connected instrument do not match. • The volumes for the selected parts are set to the minimum levels. Use the balance buttons to set the volumes of the relevant parts to appropriate levels. • The LOCAL CONTROL for a part performed on the keyboard is set to OFF. Set the LOCAL CONTROL to ON.
	Only percussive instrument sounds are produced when the keyboard of the connected instrument is played.	• A **KEYBOARD PERC** sound (numbers **95–99**) has been selected. On the **SOUND SELECT** number pad, select a different sound number.
	The volume is very low when the keyboard of the connected instrument is played.	• The volume setting in the **SEQUENCER** contents is very low. Follow the INITIAL procedure to reset the settings.
	Some sounds cannot be selected.	• When the GENERAL MIDI status is set to on, The sounds which can be selected and operation which can be executed are limited. Turn the GENERAL MIDI status off to return the instrument to its normal operation.
	The sound you hear is different from the sound you selected.	• This sometimes occurs when you play back **SEQUENCER** or **COMPOSER** data which was created on a different model, or when MIDI data is received from a connected instrument. Select the desired sounds again.
Rhythm	The rhythm does not start.	• The **DRUMS** volume is set to the minimum level. Use the balance buttons to set the **DRUMS** volume to an appropriate level. • In the **RHYTHM SELECT** section, a rhythm in **MEMORY A** or **MEMORY B** with no stored pattern was selected. Select a different rhythm. • A **SEQUENCER** track button is on. When you are not playing back the **SEQUENCER** performance, turn off the track buttons. • CLOCK is set to MIDI. Set CLOCK to INTERNAL. • The rhythm does not work when the GENERAL MIDI mode is set to ON. Turn the GENERAL MIDI status off to return the instrument to its normal operation.

	Phenomenon	Remedy
SEQUENCER	Storage is not possible.	• The remaining memory capacity of the **SEQUENCER** is 0. Follow the SONG CLEAR or TRACK CLEAR procedure to erase the memory.
	Multi-track storage is not possible.	• The playback track has been selected, but the **START/STOP** button has not been pressed. A flashing track indicator shows the track which is ready for recording, and a lit track indicator shows a track which is ready for playback. To record one track while listening to another (playback) track, press the **START/STOP** button to begin playback.
	The playback measure indication is different from when the performance was recorded.	• The number of measures corresponds to the time signature of the rhythm selected at the start of recording. To change the rhythm in the middle of the song, record the rhythm change in the RHYTHM part.
AUTO PLAY CHORD	No sound is produced for the automatic accompaniment.	• In the **RHYTHM SELECT** section, a rhythm in **MEMORY A** or **MEMORY B** with no stored pattern was selected. Select a different rhythm.
	No sound is produced for the automatic accompaniment, or only the sounds of some parts are produced.	• An **ACCOMP** part does not sound if its corresponding volume is set to the minimum level. Use the respective balance buttons to set the **ACCOMP 1**, **2** and **3** volumes to appropriate levels.
COMPOSER	Storage is not possible.	• The remaining memory capacity of the **COMPOSER** is 0.
	Setting the time signature and number of measures is not possible.	• The time signature and number of measures cannot be changed for a pattern which is currently recorded in the **COMPOSER**. If you wish to change the time signature and/or measure data, first follow the procedure to clear the memory.
	The playback timing of the rhythm pattern is different from the timing with which it was recorded.	• The QUANTIZE function was on when the pattern was recorded and the timing was automatically corrected. Set the quantize level to a smaller note unit or to OFF when recording.
Disk Drive	The Disk Drive produces a noise during recording or playback.	• This occurs when the Disk Drive is reading a disk. It does not indicate a problem.
	When the procedure to load from a disk is performed, the contents of this instrument's memory are erased.	• When performing the load operation from a disk, this instrument's memory changes to that of the data loaded from the disk. If you wish to preserve a song which is stored in this instrument's memory, save it on a disk before performing the load procedure.
Other	The cabinet becomes warm during use.	• This instrument has a built-in power source that heats the cabinet to some degree. This is not an indication of trouble.

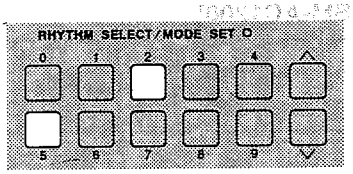
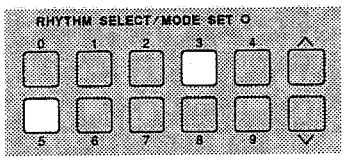
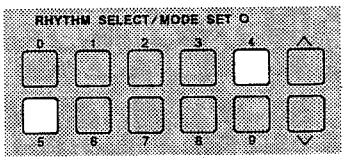
ABOUT THE SELF-DIAGNOSTIC FUNCTION

This model has some self-diagnostic capabilities. When set to the self-diagnostic mode, operation of various components can be verified by following the procedures in the chart below.

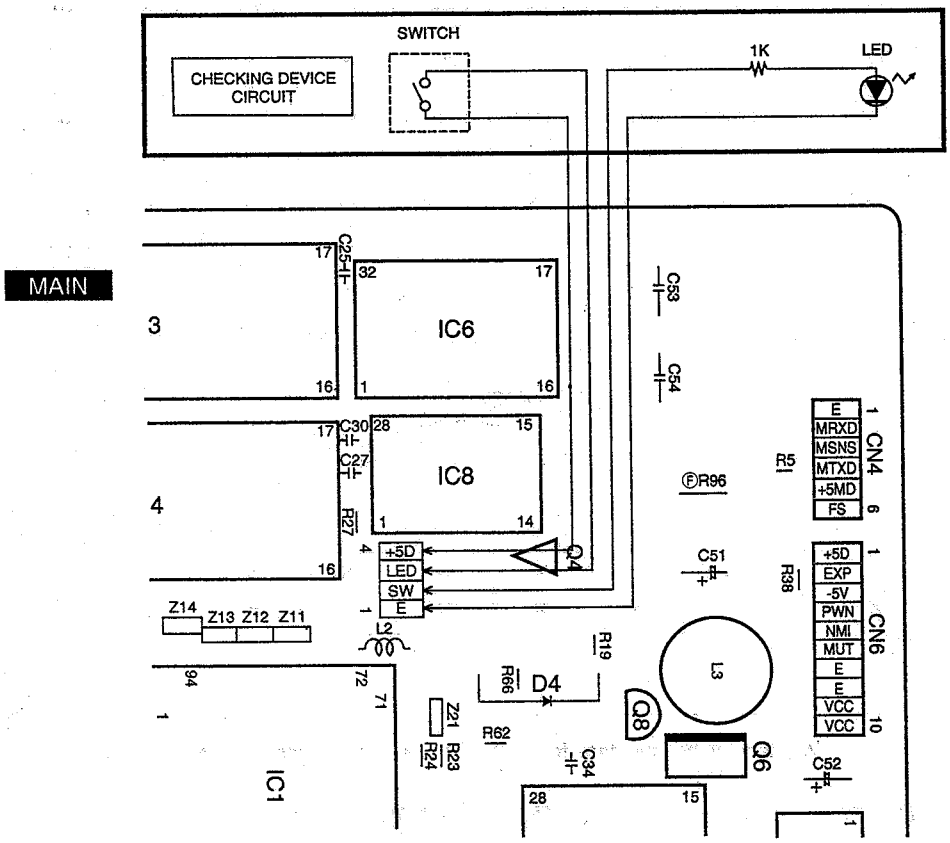
<table>
<tr><th>No.</th><th>P. C. Board</th><th>TEST MODE</th><th>Procedure</th></tr>
<tr><td>1</td><td>MAIN</td><td>RAM (IC6,7,8), ROM (IC5) check</td><td>1. Connect the CHECKING DEVICE (refer to page I-12) to CN8 on the MAIN P.C.Board, and turn on the CHECKING DEVICE switch.
2. Turn on the play button.</td></tr>
<tr><td></td><td></td><td colspan="2">When the play button is turned on, the LED of the CHECKING DEVICE flashes 8 times. The first 4 flashes are for the RAM check, and the latter 4 flashes are for the ROM check. The order of the LED flashes correspond to the respective IC number as shown below. If an IC is defective, the corresponding flash time is longer.
Examples
1. RAM OK, ROM OK
2. RAM OK, ROM (IC5) defective
3. RAM (IC6) defective, ROM OK
 

NOTE : ● indicates short flash time = OK
▬ indicates long flash time = Defective</td></tr>
<tr><td>2</td><td>MAIN</td><td>Gate array (IC2) check</td><td>Press and hold the 4 and 5 buttons shown below, and then turn on the play button.
 
</td></tr>
<tr><td></td><td></td><td colspan="2">The contrast of the LCD (Musical Display) on the control panel change in 8 stages. If the contrast dose not change, the gate array (IC2) is defective.</td></tr>
<tr><td>3</td><td>CP</td><td>CPU (IC1) check</td><td>1. Connect the CHECKING DEVICE to CN8 on the MAIN P. C. Board (The Checking Device switch should be off).
2. Press and hold the 1 and 5 buttons shown below, and then turn on the play button.
 
</td></tr>
<tr><td></td><td></td><td colspan="2">When the play button is turned on, the LED of the CHECKING DEVICE flashes. The LED flashes 4 times, the first flash corresponding to the IC1 check. If IC1 is defective, the first flash will be longer.
1. IC1 OK
2. IC1 defective
 

NOTE : ● indicates short flash time = OK
▬ indicates long flash time = Defective</td></tr>
</table>

No.	P. C. Board	TEST MODE	Procedure
4	MAIN	Wave ROM (IC16, 17) check	Press and hold the **2** and **5** buttons shown below, and then turn on the play button. 
		When set to the self-diagnostic mode, the Wave ROM outputs a sine wave. If no sound is produced, or if the sound is distorted, the Wave ROM is defective.	
5	CP	Control panel LED check	Press and hold the **3** and **5** buttons shown below, and then turn on the play button. 
		Press the buttons on the control panel and confirm that the corresponding LEDs light.	
6	CP	LCD display check	Press and hold the **4** and **5** buttons shown below, and then turn on the play button. 
		When set to the self-diagnostic mode, the test pattern is shown on the display. Monitor the display to confirm that the characters appear correctly.	

■ Connection between serving CHECKING DEVICE and MAIN P. C. Board



MIDI IMPLEMENTATION CHART

MIDI Orchestra [SM-AC1200] **(Transmitted)**

Function		RIGHT1,2,LEFT, PART4～15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks
Basic Channel	Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized
	Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	
Mode	Default	3	3	3	3	3	3	3	3	OMNI OFF,POLY MODE
	Messages	×	×	×	×	×	×	×	×	
	Altered	–	–	–	–	–	–	–	–	
Note Number		0-119	0-119	0-119	0-119	0-119	0-119	0-119	–	Changes depending on the position of the transpose control,octave shift,and drums type.
	True voice	–	–	–	–	–	–	–	–	
Velocity	Note ON	○	○	○	○	○	○	○	–	
	Note OFF	×	×	×	×	×	×	×	–	
After Touch	Key's	×	×	×	×	×	×	×	–	
	Ch's	×	×	×	×	×	×	×	–	
Pitch Bend		○×*	×	○×*	○×*	○×*	×	○×*	×	
Control Change	0,32	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	bank select MSB, LSB
	1	○×*	×	○×*	○×*	○×*	×	○×*	×	modulation
	6,38	○×*	×	×	×	×	×	×	×	data entry MSB, LSB
	7	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	volume
	10	○×*	×	×	×	×	×	×	×	panpot
	11	○×*	○×*	×	×	×	×	×	○×*	expression
	64	○×*	○×*	○×*	○×*	○×*	○×*	×	×	sustain
	80	×	×	○×*	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	○×*	×	×	intro, fill in, ending
	91	○×*	○×*	○×*	○×*	○×*	○×*	○×*	○×*	reverb
	93	○×*	×	○×*	○×*	○×*	×	○×*	×	digital effect
	100,101	○×*	×	×	×	×	×	×	×	RPN LSB, MSB
	120	○	○	×	×	×	×	×	×	all sound off
	121	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	reset all cotrollers
Prog Change		○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	Changes depending on program change mode and prog.cng to p.mem.
	True #	–	–	–	–	–	–	–	–	
System exclusive		○								
System common	Song Pos	○×*								
	Song Sel	○×* (0-19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	○×*								start/stop,continue
Aux Messages	Local ON/ OFF	×	×	×	×	×	×	×	–	
	All notes OFF	×	×	×	×	×	×	×	–	
	Active Sense	○								
	Reset	×								
Notes		○×*……Whether or not the data for each of these items is transmitted can be set.								

Mode 1: OMNI ON, POLY Mode 2: OMNI ON, MONO ○:Yes

Mode 3: OMNI OFF, POLY Mode 4: OMNI OFF, MONO ×:No

MIDI Orchestra [SM-AC1200]

(Recognized)

Function		RIGHT1,2,LEFT, PART4～15	PART16	ACMP1	ACMP2,3	BASS	DRUMS	CHORD	CONTROL	Remarks
Basic	Default	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	memorized
Channel	Changed	1-16	1-16	1-16	1-16	1-16	1-16	1-16	1-16	
	Default	3	3	3	3	3	3	3	3	OMNI OFF,POLY MODE
Mode	Messages	×	×	×	×	×	×	×	×	
	Altered	–	–	–	–	–	–	–	–	
Note		0-127	0-127	0-127	0-127	0-127	0-127	0-127	–	Changes depending on the position of the transpose control,octave shift, and drums type.
Number	True voice	0-127	0-127	0-127	0-127	0-127	0-127	0-127	–	
Velocity	Note ON	○	○	○	○	○	○	○	–	
	Note OFF	×	×	×	×	×	×	×	–	
After	Key's	×	×	×	×	×	×	×	–	
Touch	Ch's	×	×	×	×	×	×	×	–	
Pitch Bend		○×*	×	○×*	○×*	○×*	×	○×*	×	
Control Change	0,32	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	bank select MSB, LSB
	1	○×*	×	○×*	○×*	○×*	×	○×*	×	modulation
	6,38	○×*	×	×	×	×	×	×	×	data entry MSB, LSB
	7	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	volume
	10	○×*	×	×	×	×	×	×	×	panpot
	11	○×*	○×*	×	×	×	×	×	○×*	expression
	64	○×*	○×*	○×*	○×*	○×*	○×*	×	×	sustain
	80	×	×	○×*	×	×	×	×	×	auto play chord
	82	×	×	×	×	×	○×*	×	×	intro, fill in, ending
	91	○×*	○×*	○×*	○×*	○×*	○×*	○×*	○×*	reverb
	93	○×*	×	○×*	○×*	○×*	×	○×*	×	digital effect
	100,101	○×*	×	×	×	×	×	×	×	RPN LSB, MSB
	120	○	○	○	○	○	○	○	×	all sound off
	121	○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	reset all cotrollers
Prog Change		○×*	○×*	○×*	○×*	○×*	○×*	○×*	×	Changes depending on program change mode and prog.cng to p.mem.
	True #	0-127	0-127	0-127	0-127	0-127	0-127	0-127	–	
System exclusive		○								
System common	Song Pos	○×*								
	Song Sel	○×* (0-19)								
	Tune	×								
System Real Time	Clock	○								
	Commands	○×*								start/stop,continue
Aux Messages	Local ON/ OFF	×	×	×	×	×	×	×	–	
	All notes OFF	○	○	○	○	○	○	○	–	
	Active Sense	○								
	Reset	×								
Notes		○×*……Whether or not the data for each of these items is received can be set.								

Mode 1: OMNI ON, POLY Mode 2: OMNI ON, MONO ○:Yes

Mode 3: OMNI OFF, POLY Mode 4: OMNI OFF, MONO ×:No

PRECAUTIONS BEFORE SERVICING

■ Precautions for measuring of the output waveforms.

1. The waveform was measured with a "National Digital Storage Oscilloscope VP-5730A". Therefore the waveforms of musical tone signals shown may differ somewhat due to the difference in the timing of triggering.
2. Since the 1/10 test probe is used, the indicated voltage value on the bottom part of each waveform photo is 1/10 of the actual value (e.g. 0.2 V/cm should be 2.0 V/cm).
3. To measure the waveforms, first set this unit to the self-diagnostic mode (refer to page I-12, No. 4). The Wave ROM output will then be output as a sine wave to facilitate the servicing check.

■ Important safety notice:

Components identified by a ⚠ mark have special characteristics impotant for safety.
When replacing any of these components, use only manufacture's specified parts.

■ Symbolic Marks

The symbolic marks for resistors and capacitors which used in this circuits are classified as following TABLE-1 and TABLE-2.

1. RESISTORS
   - Resistors without symbolic mark are FIXED CARBON FILM RESISTORS (ERD-type).
   - All resistors are 1/4 WATT, ±5 % TOLERANCE unless otherwise designated in schematic diagrams.

(TABLE-1)

SYMBOL	SPECIFICATION	SYMBOL	SPECIFICATION
Ⓕ	Fixed Carbon Film Resistors " FLAME-PROOF " (ERD—F—type)	Ⓕ	Fixed Metal Film Resistors " FLAME-PROOF " (ERX—type)
Ⓕ	Fixed Wire Wound Resistors " FLAME-PROOF " (ERF—type)	[F]	Fuse Type Fixed Metal Oxide Film Resistors " FLAME-PROOF " (ERQ—type)
Ⓕ	Fixed Metal Oxide Film Resistors " FLAME-PROOF " (ERG—type)	[F]	Fuse Type Fixed Carbon Film Resistors " FLAME-PROOF " (ERD2FC—type)
Ⓖ	Fixed Metal Film Resistors (Precision and High Stability) (ERO—type)		

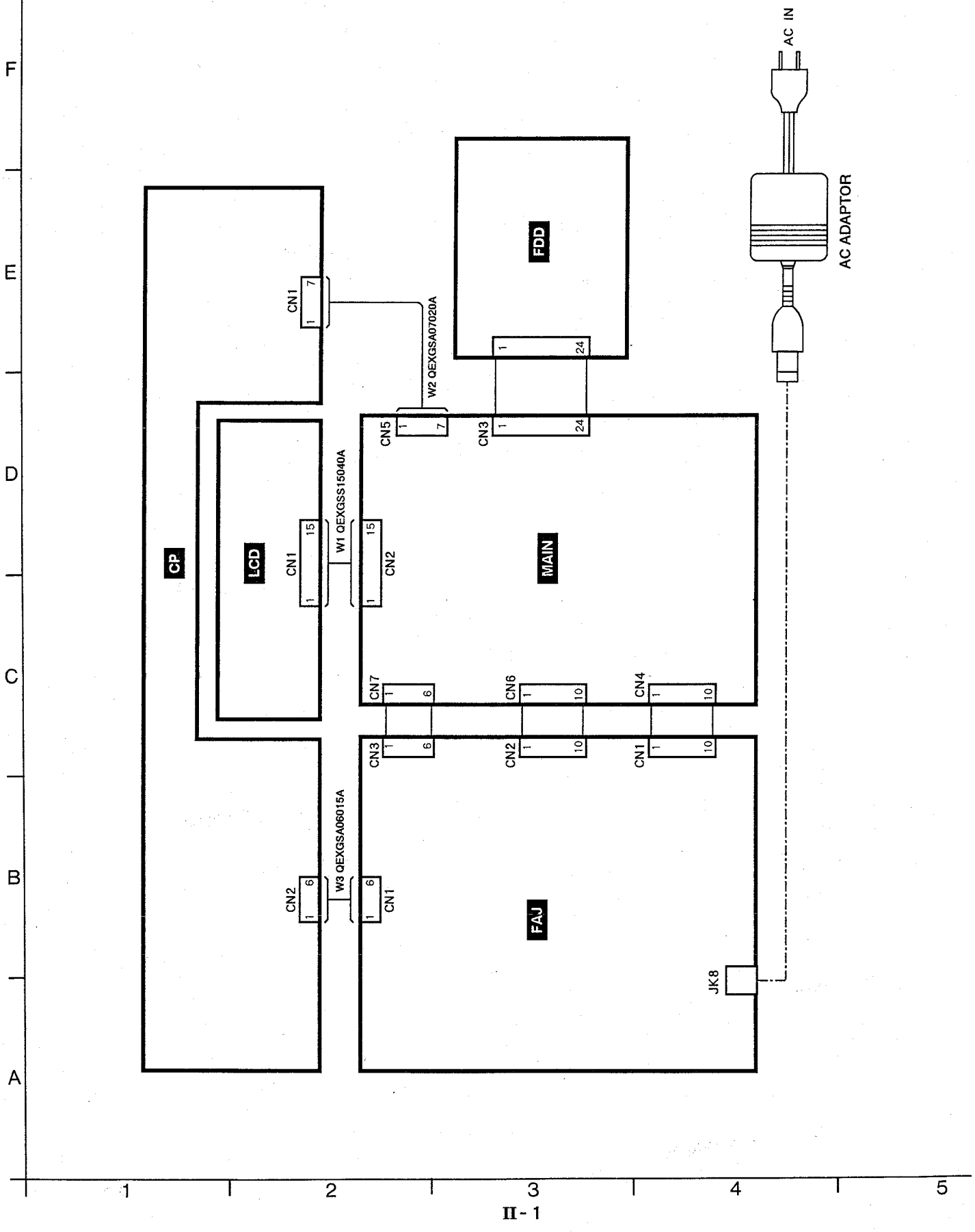
2. CAPACITORS
   - Capacitors without symbolic mark are POLYESTER CAPACITORS. (ECQM-type, ECQG-type, ±10 % Tolerance)
   - Polarized capacitors without symbolic mark are Aluminum Electrolytic Capapcitors. (ECEA-type, ±20 % Tolerance)

(TABLE-2)

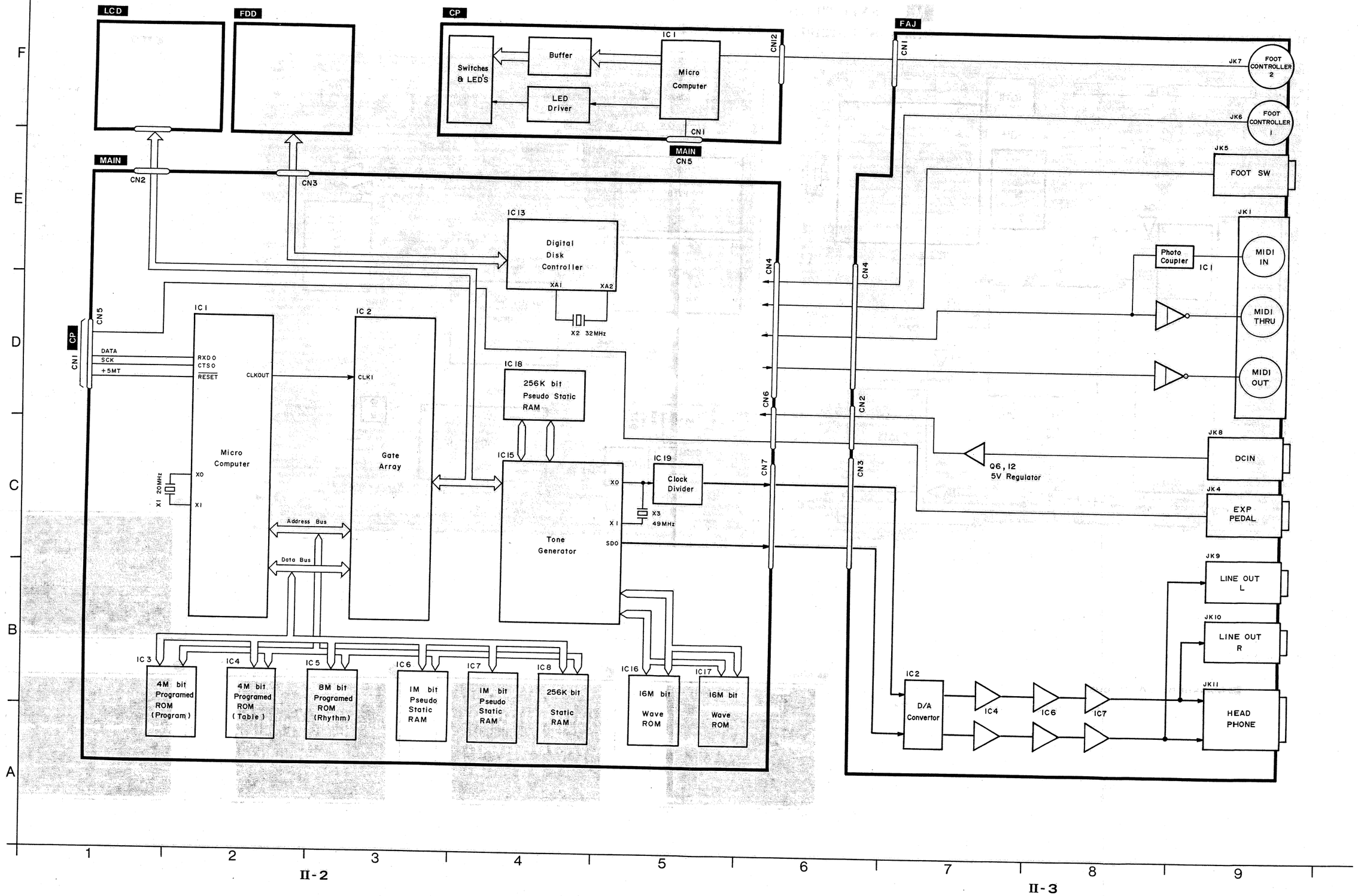
SYMBOL	SPECIFICATION	TYPE
Ⓝ	Non-Polarized Electrolytic Capacitors	ECEA_KN_type
Ⓨ	Non-Polarized Electrolytic (for Network System)	ECEA_Y_type
Ⓣ	Tantalum Solid Electrolytic Capacitors	ECS_type
TF	Metalized Plastic Film Capacitors (TF Series)	ECQV_type
○	Temperature Compensating Ceramic Capacitors	ECC_type
	High-Dielectric Constant Ceramic Capacitors	ECK_type ECR_type
	Axial Lead Ceramic Capacitors	ECB_type
	Metalized Polyester Film Capacitors for Across the Line	ECQ_EW_type
	Aluminum Electrolytic Capacitors for Smoothing Circuit	ECES_type
	Multilayer Ceramic Chip Capacitors	ECUV_type

MEMO

WIRING CONNECTION Diagram

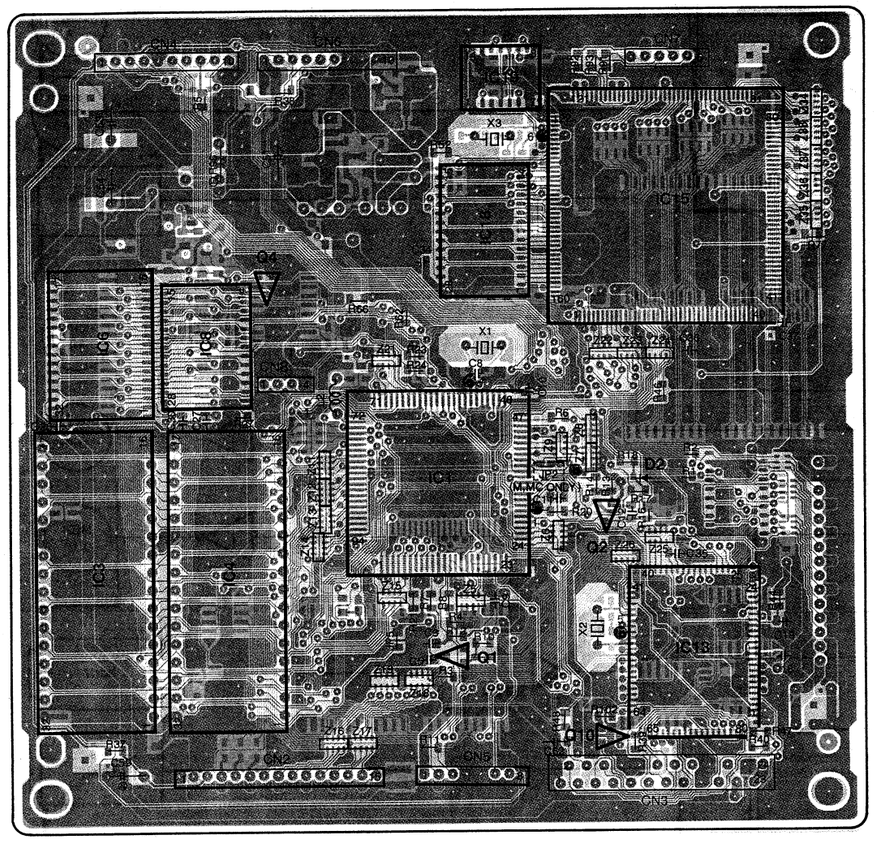


BLOCK Diagram

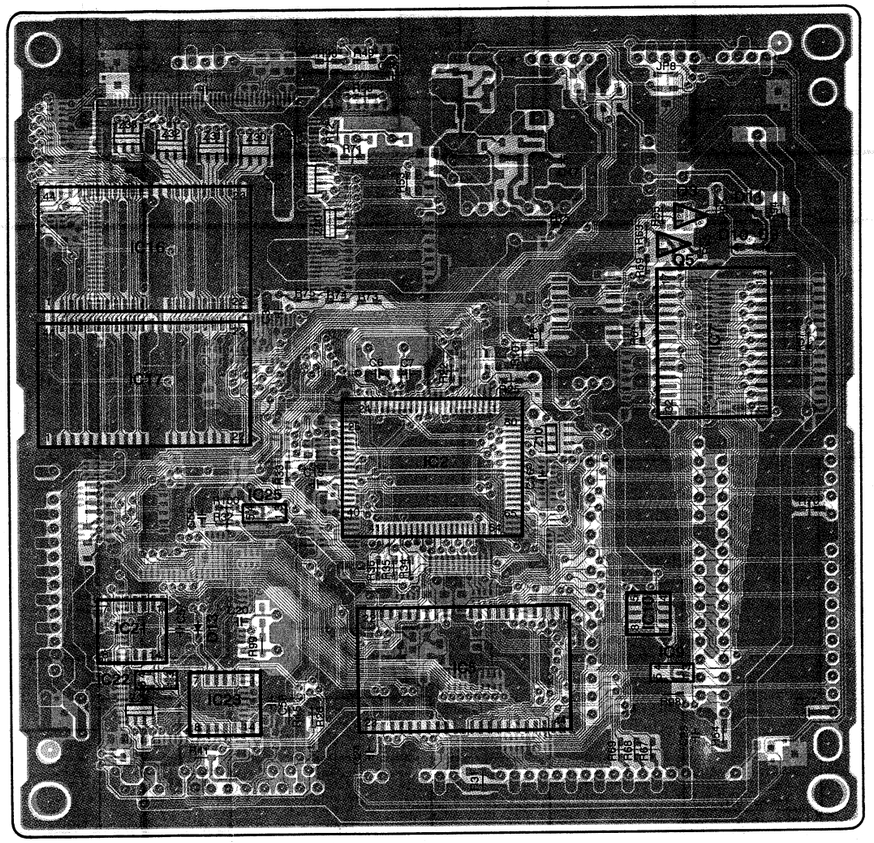


M (SXPG221021)
Others (SXPG221011)

MAIN (COMPONENT SIDE)



MAIN (FOIL SIDE)



MAIN

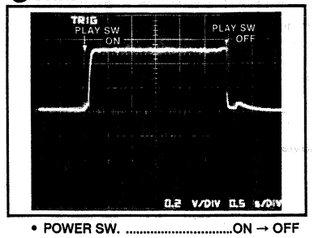
NOTES:

- IC'S
  - IC1: D70325GJ-10
  - IC2: D65012GF-A79
  - IC3: QSIGCAC12AX
  - IC4: QSIGCAC12BX
  - IC5: QSIG03C08048
  - IC6, 7: T518129AFWL8
  - IC8: M5256BFP85LL
  - IC9: TC7SU04F
  - IC10: TC7W32F
  - IC13: D72068GF-3B9
  - IC15: D93083GDLBD
  - IC16: QSIGH3C16CN6
  - IC17: QSIGH3C16CN7
  - IC18: HM65256BLF10
  - IC19: D74HC74GS
  - IC21: D74HC00GS
  - IC22: TC7S86F
  - IC23: D74HC04GS
  - IC25: TC7S14F
- TRANSISTORS
  - Q1, 3~5: 2SD601AQ
  - Q2, 10: 2SB709AR
- DIODES
  - D1, 2: MA110
  - D9, 10: MA151WK
  - D11: MA110
  - D13: MA732

■ Measuring Conditions

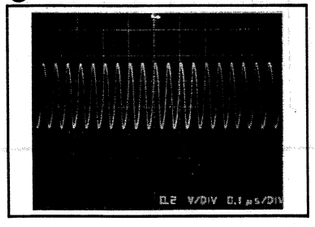
Press and hold the 4 and 5 buttons shown below, and then turn on the play button.

❶ NMI

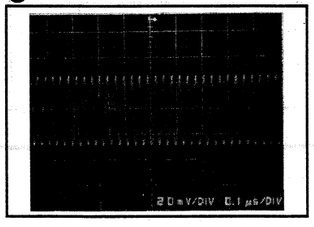


• POWER SW. .....ON → OFF

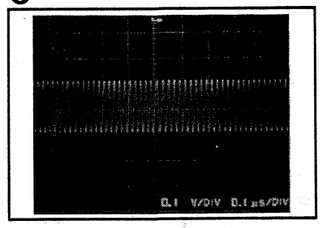
❹



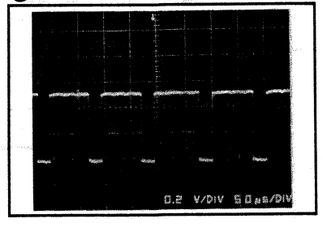
❺



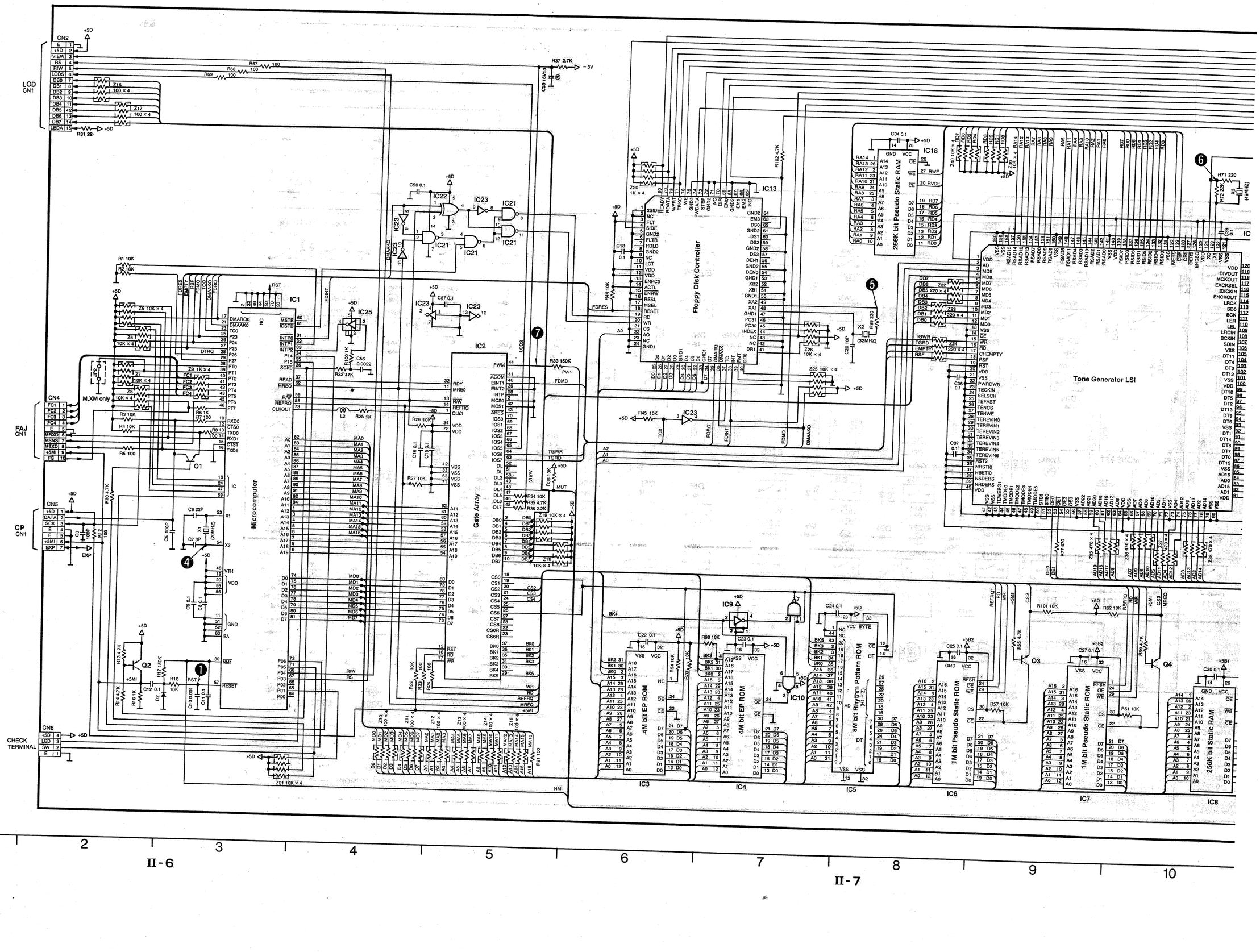
❻

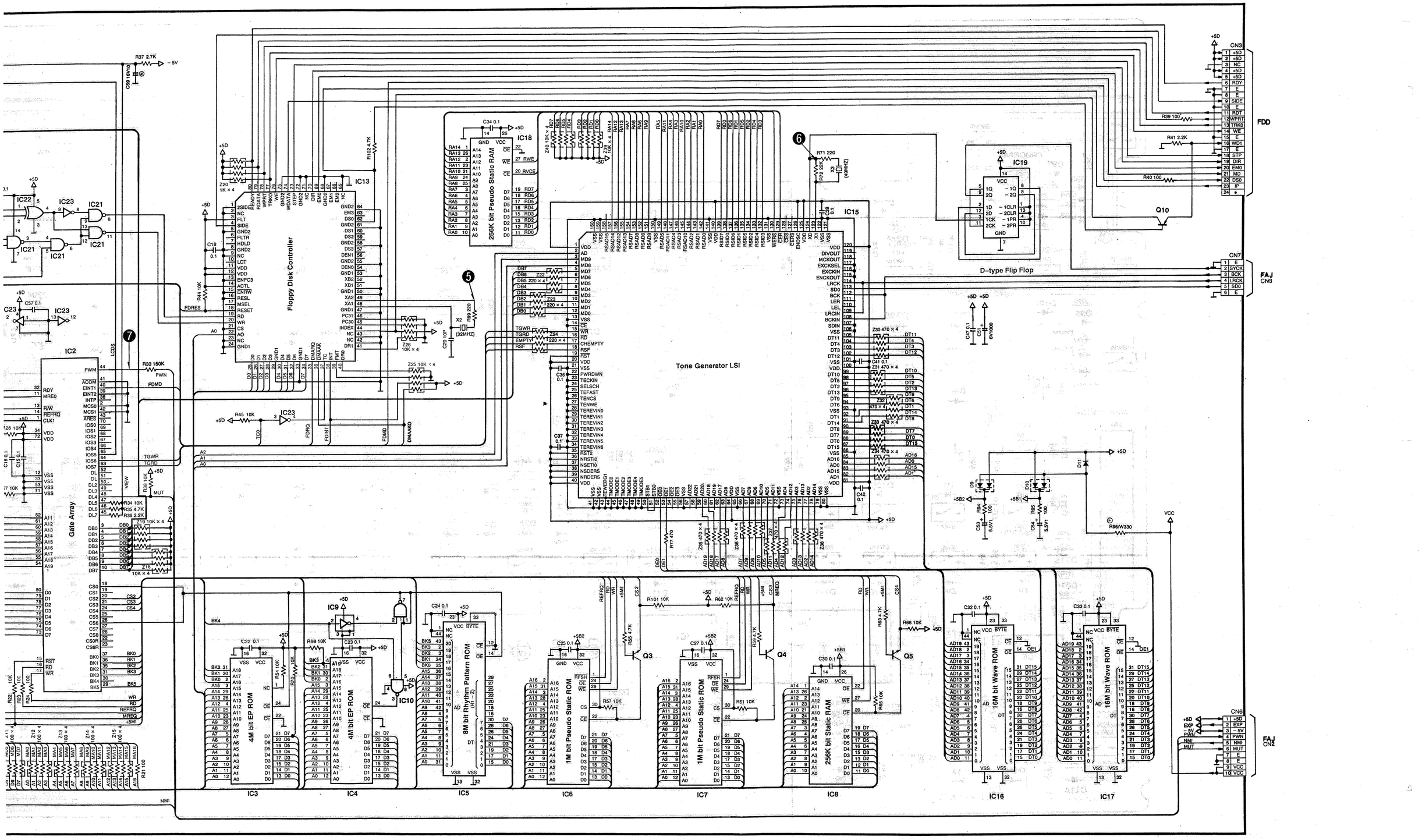


❼



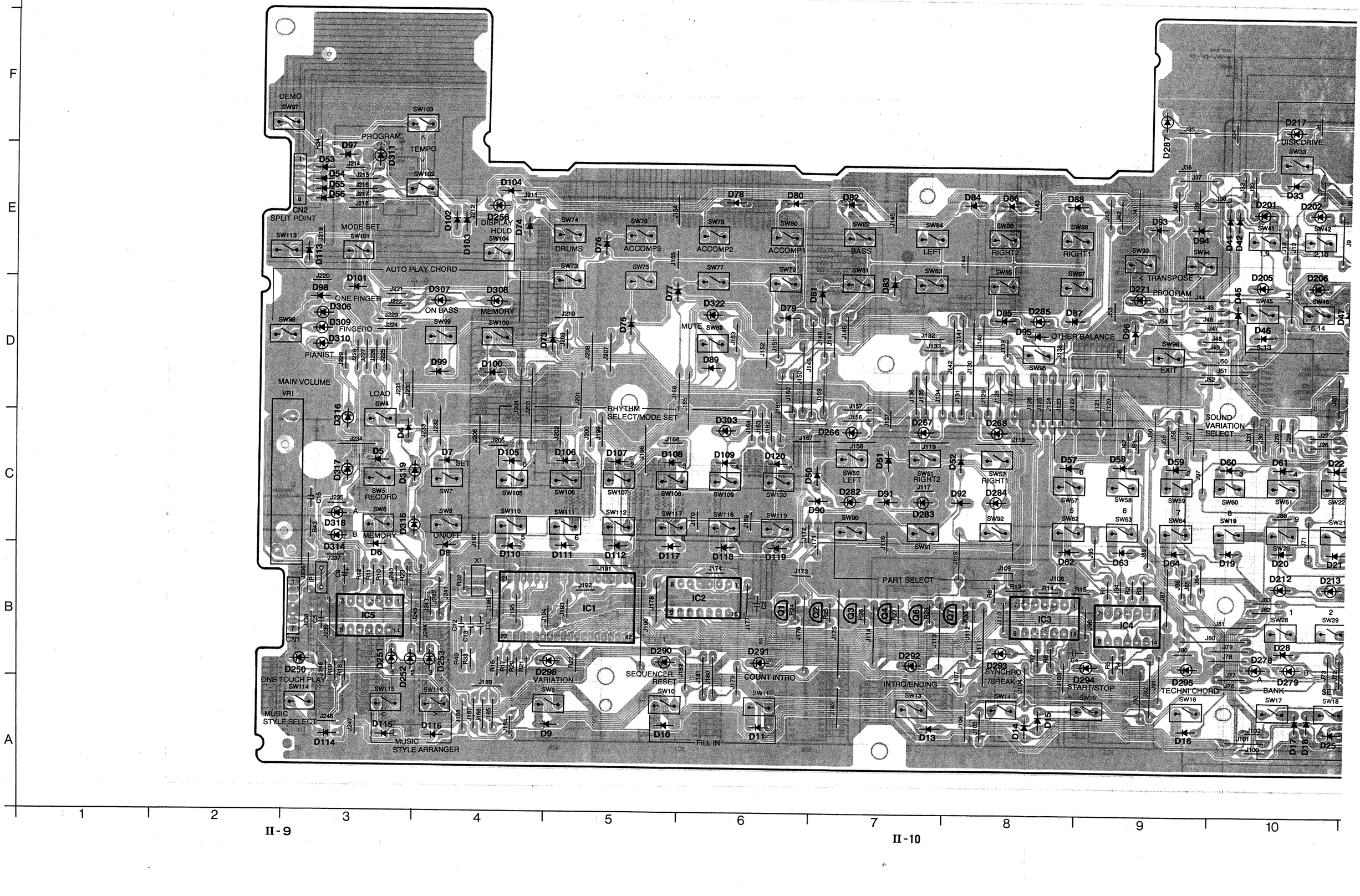
MAIN P.C. Diagram

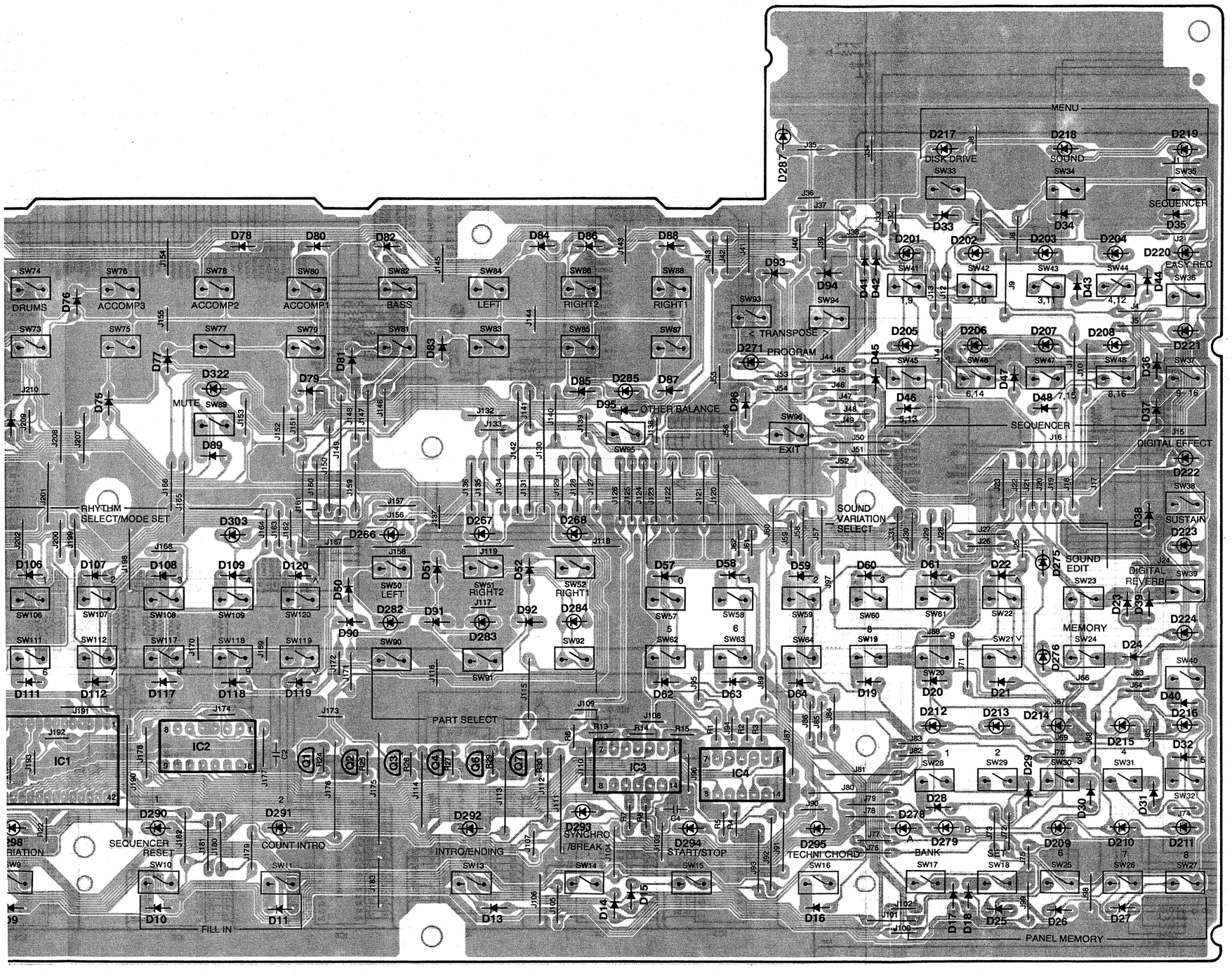



IC2
Gate Array
Floppy Disk Controller
256K bit Pseudo Static RAM
Tone Generator LSI
D-type Flip Flop
4M bit EP ROM
4M bit EP ROM
8M bit Rhythm Pattern ROM (H1 – 2)
1M bit Pseudo Static ROM
1M bit Pseudo Static ROM
256K bit Static RAM
16M bit Wave ROM
16M bit Wave ROM
FDD
FAJ CN3
FAJ CN2
Q3
Q4
Q5
Q10
NMI

CP P.C. Board

CP (SXPG220611)




MENU
D217
DISK DRIVE
D218
SOUND
D219
SEQUENCER
D287
D33
D34
D35
D201
D202
D203
D204
D220
EASY REC
SW33
SW34
SW35
SW41
SW42
SW43
SW44
SW36
D93
D94
SW93
SW94
< TRANSPOSE
D271
PROGRAM
D205
D206
D207
D208
D221
SW45
SW46
SW47
SW48
SW37
D46
D48
D45
D47
D36
D37
SEQUENCER
J16
DIGITAL EFFECT
J15
D222
SW38
SUSTAIN
D223
SOUND EDIT
DIGITAL REVERB
SW39
D23
D39
D275
SW23
MEMORY
SW24
D24
D224
SW40
D276
D40
D216
D32
D215
D212
D213
D214
SW28
SW29
SW30
SW31
D29
D30
D31
SW32
D28
D278
D279
D209
D210
D211
SW25
SW26
SW27
BANK
SET
D38
SOUND VARIATION SELECT
SW21
SW22
D22
SW20
D19
D20
D21
SW19
D57
D58
D59
D60
D61
SW57
SW58
SW59
SW60
SW61
SW62
SW63
SW64
D62
D63
D64
SW50 LEFT
SW51 RIGHT2
SW52 RIGHT1
D50
D51
D52
D282
D283
D284
D91
D92
D90
SW90
SW91
SW92
D106
D107
D108
D109
D120
SW106
SW107
SW108
SW109
SW120
D111
D112
D117
D118
D119
SW111
SW112
SW117
SW118
SW119
D303
D266
D267
D268
SW10
SW11
SW13
SW14
SW15
SW16
D10
D11
D13
D14
D15
D16
D290
D291
D292
D293
D294
D295
SEQUENCER RESET
COUNT INTRO
INTRO/ENDING
SYNCHRO /BREAK
START/STOP
TECHNI CHORD
FILL IN
PART SELECT
RHYTHM SELECT/MODE SET
PANEL MEMORY
IC1
IC2
IC3
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SW74
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DRUMS
ACCOMP3
ACCOMP2
ACCOMP1
BASS
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RIGHT1
D76
SW73
SW75
SW77
SW79
SW81
SW83
SW85
SW87
D77
D81
D83
D322
MUTE
SW89
D79
D85
D285
D87
D95
OTHER BALANCE
SW95
SW96
EXIT
D96
D46
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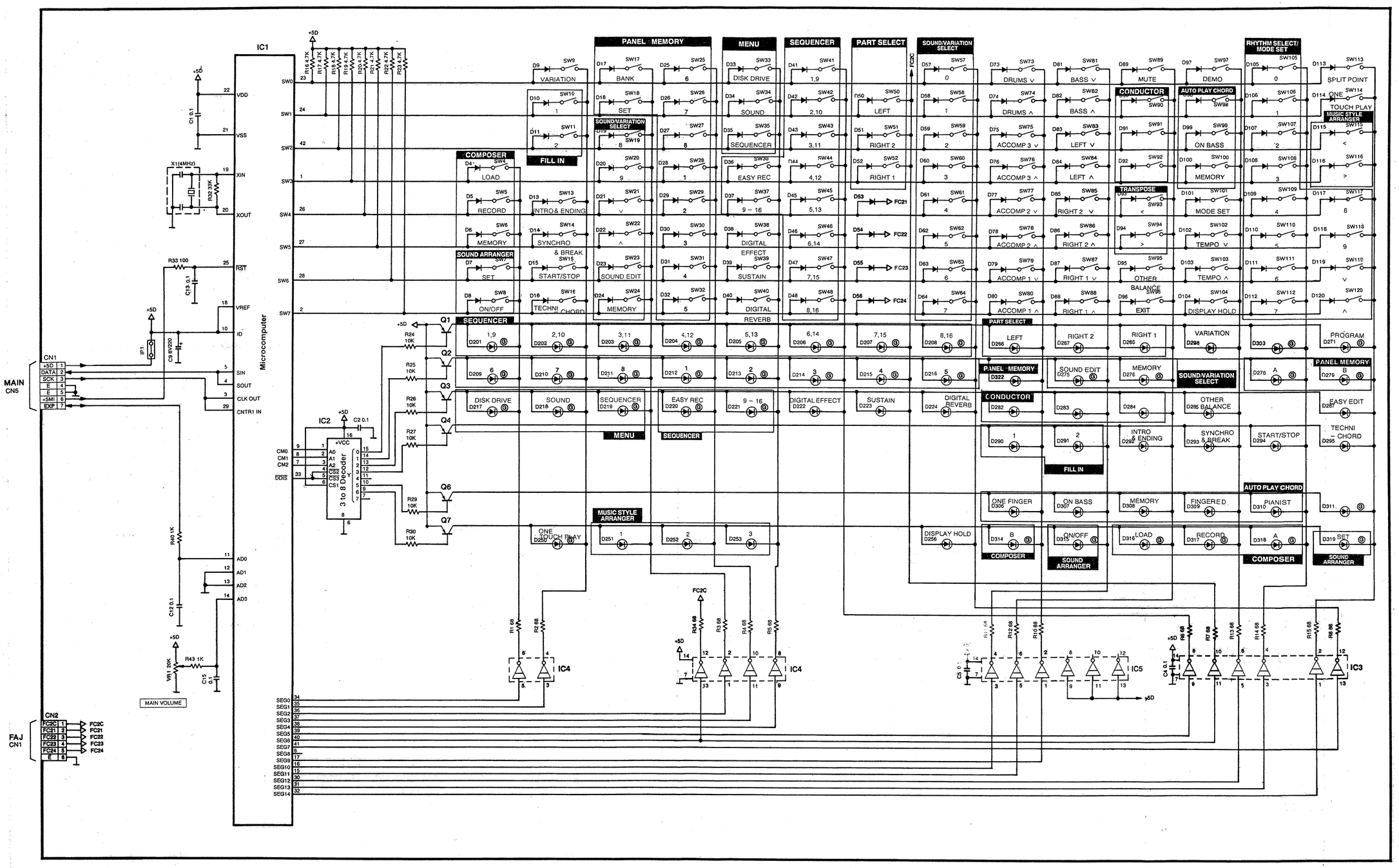
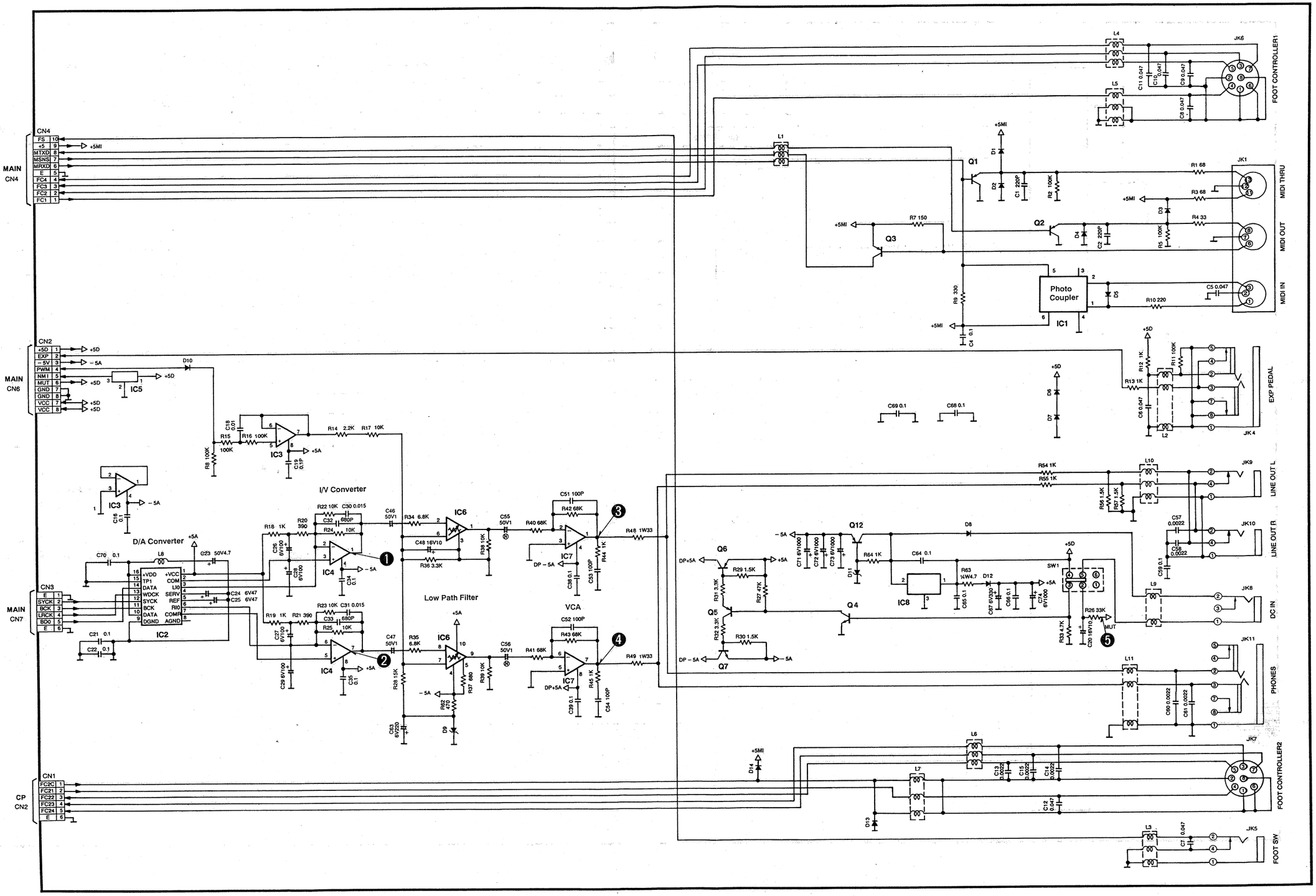
CP P.C. Diagram



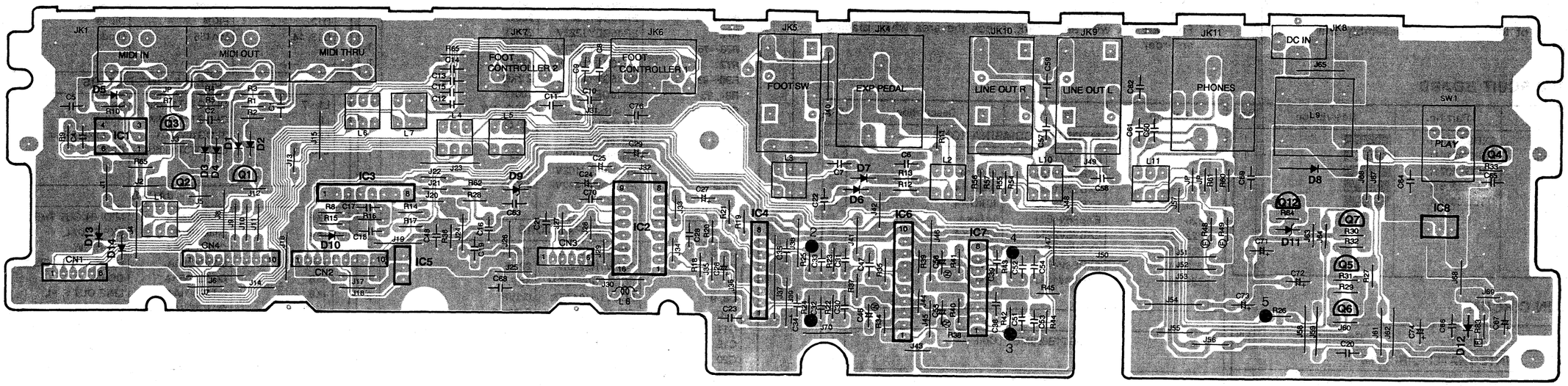
II-12 II-13

FAJ P.C. Diagram



FAJ P.C. Board

FAJ (SXPG220711)

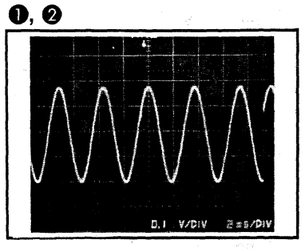


FAJ

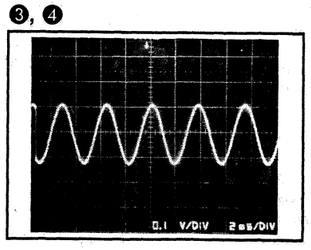
NOTES:

- IC'S
  - IC1: SVIGTLP513
  - IC2: PCM69AP
  - IC3, 4: M5218AFP
  - IC5: M51943ASL
  - IC6: SVIGM5241L
  - IC7: SVIGM5216L
  - IC8: M5F7905L
- TRANSISTORS
  - Q1~3: 2SA1015-GR
  - Q4: 2SC1815GR
  - Q5, 6: 2SA1015-GR
  - Q7: 2SC1815GR
  - Q12: 2SA1015-GR
- DIODES
  - D1~7: MA165
  - D8: RK34LF
  - D9: MA4022
  - D10: MA165
  - D11: MA4056
  - D12: EK04
  - D13, 14: MA165

❶, ❷



❸, ❹



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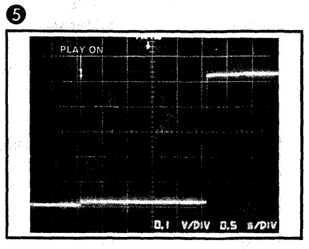
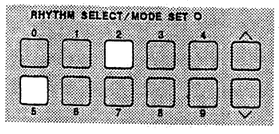


■ Measuring Conditions

1. The tone signal output varies with the level of key pressing force.
   In this measurement, the waveform obtained with maximum key pressing force is shown.
2. Press and hold the 2 and 5 buttons shown below, and then turn on the play button.
   NO. 5.....ON
   MAIN VOL....MAX



REPLACEMENT PARTS LIST.....P.C.B. and Wiring Parts

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "S" mark is service standard parts and may differ from production parts.
4. ○ mark are new parts.
5. For part No. with area mark, check the area when placing an order.

■ PRINTED CIRCUIT BOARD

	RTL	Area	Part No.	Description	P/S
○	RTL	M	SXPG221021	MAIN	1
○	RTL	OTHERS	SXPG221011	MAIN	1
○	RTL		SXPG220711	FAJ	1
○	RTL		SXPG220611	CP	1
			QSLG004BA	LCD	1

MAIN MAIN CIRCUIT

	Ref. No.	Part No.	Description	P/S
	INTEGRATED CIRCUITS			
	IC1	D70325GJ-10	16 bit Microcomputer	1
	IC2	D65012GF-A79	Gate Array	1
○	IC3	QSIGCAC12AX	4M EP ROM	1
○	IC4	QSIGCAC12BX	4M EP ROM	1
	IC5	QSIG03C08048	8M bit Rhythem Pattern ROM	1
	IC6, 7	T518129AFWL8	1M bit Pseudo Static RAM	2
	IC8	M5256BFP85LL	256K bit STATIC RAM	1
	IC9	TC7SU04F	Inverter	1
	IC10	TC7W32F	Inverter	1
	IC13	D72068GF-3B9	Floppy Disk Controller	1
	IC15	D93083GDLBD	Tone Generator LSI	1
○	IC16	QSIGH3C16CN6	16M bit Wave ROM	1
	IC17	QSIGH3C16CN7	16M bit Wave ROM	1
	IC18	HM65256BLF10	256K bit Pseudo Static RAM	1
	IC19	D74HC74GS	D-type Flip flpos	1
	IC21	D74HC00GS	Quad 2 input NAND GATES	1
	IC22	TC7S86F	2INPUT OR Gate	1
	IC23	D74HC04GS	6 Inveter	1
	IC25	TC7S14F	OR Gate	1
	TRANSISTORS			
	Q1, 3~5	2SD601AQ	Transistor	4
	Q2, 10	2SB709AR	Transistor	2
	DIODES			
	D1, 2	MA110	Diode	2
	D9, 10	MA151WK	Diode	2
	D11	MA110	Diode	1
	D13	MA732	Diode	1
	OSCILLATORS			
	X1	SVQGA20MX040	20MHz, Ceramic Oscillator	1
	X2	QSXG1I3200A	32MHz, Quartz Oscillator	1
	X3	QSXG1I4915A	49MHz, Quartz Oscillator	1

Ref. No.	Part No.	Description	P/S
COMPONENT COMBINATIONS			
Z5~8	EXBV8V103J	10kΩ×4	4
Z9	EXBV8V102J	1kΩ×4	1
Z10~17	EXBS8V101J	100Ω×4	8
Z18, 19, 21	EXBV8V103J	10kΩ×4	3
Z20	EXBS8V102J	1kΩ×4	1
Z22~24	EXBV8V221J	220Ω×4	3
Z25, 26	EXBV8V103J	10kΩ×4	2
Z30~38	EXBS8V471J	470Ω×4	9
Z39, 40	EXBS8V103J	10kΩ×4	2
COIL			
L2	QLQGT1B800MB	Coil	1
RESISTORS			
R1~4	ERJ6GEYJ103V	10kΩ	4
R5	ERJ6GEYJ101V	100Ω	1
R6	ERJ6GEYJ102V	1kΩ	1
R7, 8	ERJ6GEYJ101V	100Ω	2
R10	ERJ6GEYJ472V	4.7kΩ	1
R11	ERJ6GEYJ103V	10kΩ	1
R12	ERJ6GEYJ101V	100Ω	1
R13, 14	ERJ6GEYJ472V	4.7kΩ	2
R15	ERJ6GEYJ221V	220Ω	1
R16	ERJ6GEYJ102V	1kΩ	1
R17	ERJ6GEYJ154V	150kΩ	1
R18	ERJ6GEYJ103V	10kΩ	1
R20	ERJ6GEY0R00V	0Ω	1
R21	ERJ6GEYJ101V	100Ω	1
R22	ERJ6GEYJ103V	10kΩ	1
R23, 24	ERJ6GEYJ101V	100Ω	2
R25	ERJ6GEYJ102V	1kΩ	1
R26, 27	ERJ6GEYJ103V	10kΩ	2
R31	ERJ6GEYJ220V	22Ω	1
R32	ERJ6GEYJ473V	47kΩ	1
R33	ERJ6GEYJ154V	150kΩ	1
R34	ERJ6GEYJ103V	10kΩ	1
R35	ERJ6GEYJ472V	4.7kΩ	1
R36	ERJ6GEYJ222V	2.2kΩ	1
R37	ERJ6GEYJ272V	2.7kΩ	1
R38	ERJ6GEYJ103V	10kΩ	1
R39, 40	ERJ6GEYJ101V	100Ω	2
R41	ERJ6GEYJ222V	2.2kΩ	1
R44~46	ERJ6GEYJ103V	10kΩ	3
R47	ERJ6GEYJ101V	100Ω	1
R48	ERJ6GEYJ471V	470Ω	1
R49, 50	ERJ6GEYJ222V	2.2kΩ	2
R52	ERJ6GEYJ221V	220Ω	1
R53	ERJ6GEYJ102V	1kΩ	1
R54	ERJ6GEYJ103V	10kΩ	1
R55	ERJ6GEYJ472V	4.7kΩ	1
R57	ERJ6GEYJ103V	10kΩ	1

Ref. No.	Part No.	Description	P/S
R59	ERJ6GEYJ472V	4.7kΩ	1
R61, 62	ERJ6GEYJ103V	10kΩ	2
R63	ERJ6GEYJ472V	4.7kΩ	1
R65, 66	ERJ6GEYJ103V	10kΩ	2
R67~69	ERJ6GEYJ101V	100Ω	3
R70	ERJ6GEYJ103V	10kΩ	1
R71	ERJ6GEYJ221V	220Ω	1
R72	ERJ6GEYJ223V	22kΩ	1
R73~75	ERJ6GEYJ221V	220Ω	3
R77	ERJ6GEYJ471V	470Ω	1
R90~93	ERJ6GEYJ222V	2.2kΩ	4
R94, 95	ERJ6GEYJ101V	100Ω	2
R96	ERG1SJ331	330Ω, 1W	1
R98	ERJ6GEYJ103V	10kΩ	1
R99	ERJ6GEYJ221V	220Ω	1
R100	ERJ6GEYJ102V	1kΩ	1
R101	ERJ6GEYJ103V	10kΩ	1
R102	ERJ6GEYJ472V	4.7kΩ	1
CAPACITORS			
C3, 5	ECUV1H101JG	100pF	2
C6	ECUV1H220JN	22pF	1
C7	ECUV1H030CCN	3pF	1
C8, 9	ECUV1H104ZFX	0.1μF	2
C10	ECUV1H102JX	0.001μF	1
C11, 12, 15, 16, 18	ECUV1H104ZFX	0.1μF	5
C19	ECUV1H101JG	100pF	1
C20	ECUV1H100DCN	10pF	1
C22~25, 27, 30, 32~34	ECUV1H104ZFX	0.1μF	9
C35	ECUV1H331JG	330pF	1
C36, 37, 39, 41, 42, 46, 47	ECUV1H104ZFX	0.1μF	7
C51	ECEA0JU102	1000μF, 6.3V	1
C53, 54	EECS5R5V105	1F, 5.5V, Memory Back-up	2
C56	ECUV1H222KX	0.0022μF	1
C57, 58	ECUV1H104ZFX	0.1μF	2
C59	ECEA1CKN100	10μF, 16V	1
C61, 62	ECUV1H101JG	100pF	2

FAJ FILTER & AMP CIRCUIT

	Ref. No.	Part No.	Description	P/S
	INTEGRATED CIRCUITS			
	IC1	SVIGTLP513	Photo Coupler	1
	IC2	PCM69AP	Dynamic Noise Reduction	1
	IC3, 4	M5218AFP	Operational Amplifier	2
	IC5	M51943ASL	Reset IC	1
	IC6	SVIGM5241L	Dual VCA	1
	IC7	SVIGM5216L	Operational Amplifier	1
	IC8 ⚠	M5F7905L	−5V Voltage Regulator	1
	TRANSISTORS			
S	Q1~3	2SA1015-GR	2SA933STRS (SUB. Part)	3
S	Q4	2SC1815GR	Transistor	1
S	Q5, 6	2SA1015-GR	2SA933STRS (SUB. Part)	2
S	Q7	2SC1815GR	Transistor	1
S	Q12	2SA1015-GR	2SA933STRS (SUB. Part)	1

Ref. No.	Part No.	Description	P/S
DIODES			
D1~7	MA165	Diode	7
D8	RK34LF	Diode	1
D9	MA4022	Diode	1
D10	MA165	Diode	1
D11	MA4056	Zener, 5.6V	1
D12	EK04	Diode	1
D13, 14	MA165	Diode	2
COILS & LINE FILTERS			
L1~7	QLQGT3T150SA	Coil	7
L8	QLQGT1B800MA	Coil	1
L9	SLQG10W2D1	DC LINE Filter	1
L10, 11	QLQGT3T150SA	Coil	2
JACKS			
JK1	QJJG004AA	MIDI IN OUT THRU	1
JK4	SJJG100A	EXP PEDAL	2
JK5	QJJG003AA	FOOT SW	3
JK6, 7	SJSG1390A	FOOT CONTROLLER 1, 2	2
JK8	QJSG005AA	DC IN	1
JK9	QJJG003AA	LINE OUT R+L	3
JK10	QJJG003AA	LINE OUT L	3
JK11	SJJG100A	PHONES	2
SWITCHES			
S1 ⚠	QSPG1003AA	Power Switch	1
RESISTORS			
R1	ERDS2TJ680	68Ω	1
R2	ERDS2TJ104	100kΩ	1
R3	ERDS2TJ680	68Ω	1
R4	ERDS2TJ330	33Ω	1
R5	ERDS2TJ104	100kΩ	1
R7	ERDS2TJ151	150Ω	1
R8	ERDS2TJ104	100kΩ	1
R9	ERDS2TJ331	330Ω	1
R10	ERDS2TJ221	220Ω	1
R11	ERDS2TJ104	100kΩ	1
R12, 13	ERDS2TJ102	1kΩ	2
R14	ERDS2TJ222	2.2kΩ	1
R15, 16	ERDS2TJ104	100kΩ	2
R17	ERDS2TJ103	10kΩ	1
R18, 19	ERDS2TJ102	1kΩ	2
R20, 21	ERDS2TJ391	390Ω	2
R22~25	ERDS2TJ103	10kΩ	4
R26	ERDS2TJ333	33kΩ	1
R27	ERDS2TJ473	47kΩ	1
R28	ERDS2TJ153	15kΩ	1
R29, 30	ERDS2TJ152	1.5kΩ	2
R31, 32	ERDS2TJ332	3.3kΩ	2
R33	ERDS2TJ472	4.7kΩ	1
R34, 35	ERDS2TJ682	6.8kΩ	2
R36	ERDS2TJ332	3.3kΩ	1
R37	ERDS2TJ681	680Ω	1
R38, 39	ERDS2TJ103	10kΩ	2
R40~43	ERDS2TJ683	68kΩ	4
R44, 45	ERDS2TJ102	1kΩ	2
R48, 49	ERG1SJ330	33Ω, 1W	2
R54, 55	ERDS2TJ102	1kΩ	2
R56, 57	ERDS2TJ152	1.5kΩ	2
R60, 61	ERDS2TJ102	1kΩ	2

Ref. No.		Part No.	Description	P/S
R62		ERDS2TJ471	470Ω	1
R63	⚠	ERD2FCVJ4R7	4.7Ω, 1/4W, Fuse Type	1
R64		ERDS2TJ102	1kΩ	1
R65		ERDS2TJ104	100kΩ	1
CAPACITORS				
C1, 2		ECCR1H221J	220pF	2
C4		ECRF1H104ZF	0.1μF	1
C5~11		ECKR1E473ZV	0.047μF	7
C12~15		ECQG1H222KZ	0.0022μF	4
C16, 19		ECRF1H104ZF	0.1μF	2
C18		ECQB1H103JF	0.01μF	1
C20		ECEA1CKA100	10μF, 16V	1
C21, 22		ECRF1H104ZF	0.1μF	2
C23		ECEA1HKA4R7	4.7μF, 50V	1
C24, 25		ECEA0JKA470	47μF, 6.3V	2
C26~29		ECEA0JKA101	100μF, 6.3V	4
C30, 31		ECQB1H153JF	0.015μF	2
C32, 33		ECCR1H681J	680pF	2
C34, 35, 38, 39		ECRF1H104ZF	0.1μF	4
C46, 47		ECEA1HKN010	1μF, 50V	2
C48		ECEA1CKA100	10μF, 16V	1
C51~54		ECCR1H101J	100pF	4
C55, 56		ECEA1HKN010	1μF, 50V	2
C57, 58		ECQG1H222KZ	0.0022μF	2
C59		ECRF1H104ZF	0.1μF	1
C60, 61		ECQG1H222KZ	0.0022μF	2
C62		ECRF1H104ZF	0.1μF	1
C63		ECEA0JKA221	220μF, 6.3V	1
C64~66		ECRF1H104ZF	0.1μF	3
C67		ECEA0JU331	330μF, 6.3V	1
C68~70		ECRF1H104ZF	0.1μF	3
C71~74		ECEA0JU102	1000μF, 6.3V	4
C76		ECRF1H104ZF	0.1μF	1

CP CONTROL PANEL CIRCUIT

Ref. No.		Part No.	Description	P/S
INTEGRATED CIRCUITS				
IC1		M37471M2196S	16 bit Microcomputer	1
IC2		HD74LS138P	3 to 8 Decoder	1
IC3~5		HD74LS07P	Hex Buffers	3
TRANSISTORS				
Q1~4, 6, 7		2SA830SB	Transistor	6
DIODES				
D4~11, 13~48, 50~64, 73~120		MA165	Diode	107
D201~221, 250, 271, 275, 276, 278, 279, 287, 303, 311, 314~319		SEL4417GM	LED (GREEN)	36
D222~224, 251~253, 256, 266~268, 282~285, 290~295, 298, 306~310, 322		SEL4117RM	LED (RED)	27

Ref. No.		Part No.	Description	P/S
OSCILLATOR				
X1		EF0EC4004A3	4MHz, Ceramic Oscillator	1
SWITCHES				
S4~11, 13~48, 50~52, 57~64, 73~120		EVQ21507K	Push Switch	103
IC PROTECTOR				
IP1	⚠	ICP-N10T104	IC Protector	1
VARIABLE RESISTOR				
VR1		EVD07205B24G	20KB	1
RESISTORS				
R1~8, 10~15		ERDS2TJ680	68Ω	14
R16~23		ERDS2TJ472	4.7kΩ	8
R24~27, 29, 30		ERDS2TJ103	10kΩ	6
R32		ERDS2TJ333	33kΩ	1
R33		ERDS2TJ101	100Ω	1
R34		ERDS2TJ680	68Ω	1
R40, 43		ERDS2TJ102	1kΩ	2
CAPACITORS				
C1, 2, 4, 5, 12, 13, 15		ECRF1H104ZF	0.1μF	7
C9		ECEA0JKA221	220μF, 6.3V	1

■ WIRING PARTS

Ref. No.		Part No.	Description	P/S
○ W1		QEXGSS15040A	Connector with Wire	1
○ W2		QEXGSA07020A	Connector with Wire	1
○ W3		QEXGSA06015A	Connector with Wire	1

REPLACEMENT PARTS LIST.....Cabinet and Chassis Parts

Notes:

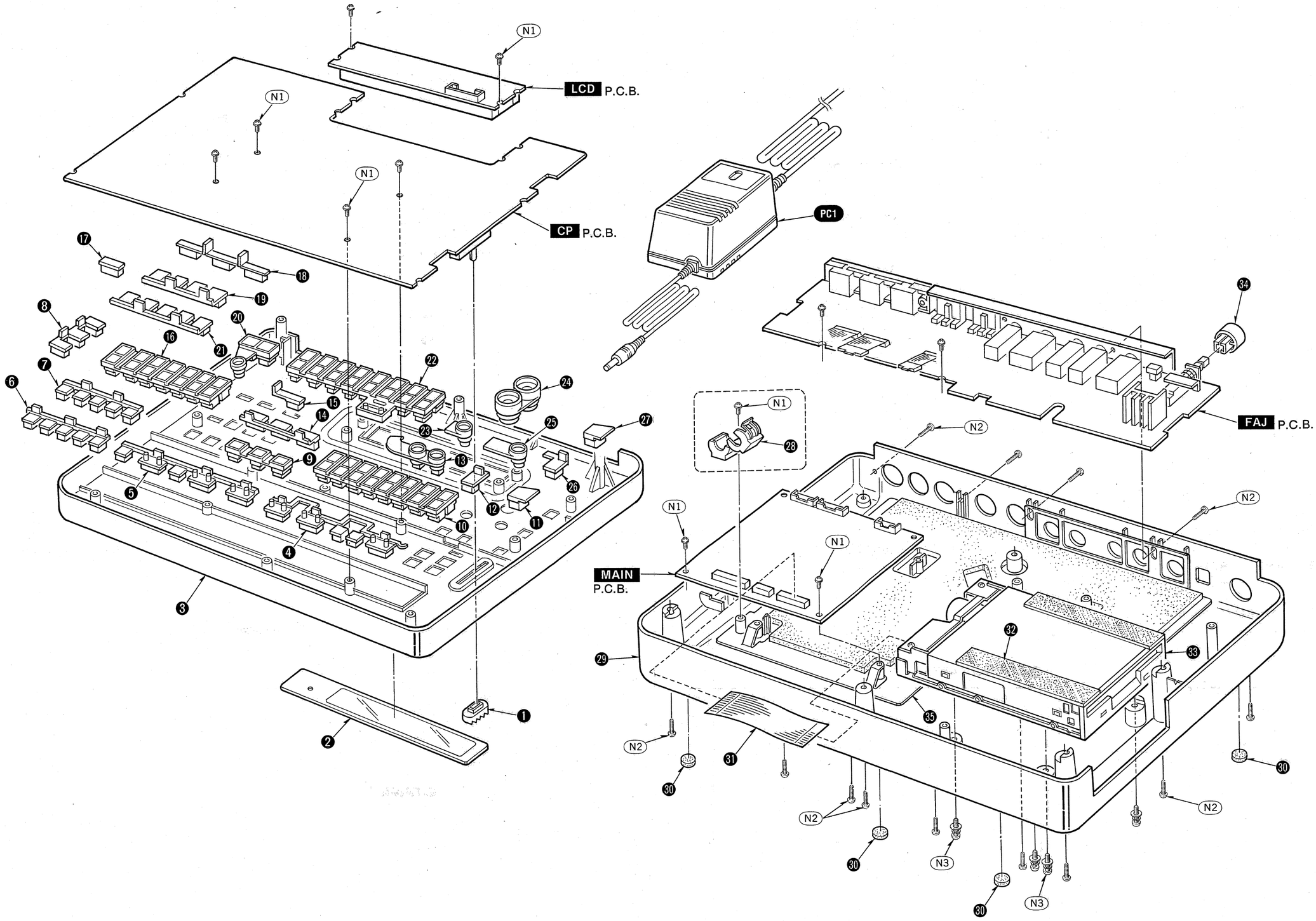
1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. ○ mark are new parts.
3. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
4. For part No. with area mark, check the area when placing an order.
5. The raw material indication for synthtic resin
   In order to facilitate classification of parts of synthetic resin manufacture and to promote the recycling of natural resources, a raw material symbol for such parts is indicated in the Ref. No./Material column.

■ CABINET & CHASSIS PARTS

Ref. No.		Part No.	Description	P/S
POWER CORD & PLUG				
○ PC1	⚠	QFAG016AA	AC Adapter, Others	1
○ PC1	⚠	QFAG017AA	AC Adapter, M MC	1
○ PC1	⚠	QFAG018AA	AC Adapter, EK	1
○ PC1	⚠	QFAG019AA	AC Adapter, XL XR	1
CABINET PARTS				
○ 1		SBNG7070A	Knob, Main Volume	1
○ 2		QKWG019AA	Displey Panel	1
○ 3	PS	QGPG0073AA	Control Panel	1
○ 4		QGUG1300CB	Button	1
○ 5		QGUG1301AB	Button	1
○ 6		QGUG1302CA	Button	1
○ 7		QGUG1302DA	Button	1
8		QGUG1307AA	Button	1
9		QGUG1299AA	Button	1
10		QGUG1304BA	Button	1
○ 11		QGUG1312CA	Button	1
○ 12		QGUG1312DA	Button	1
○ 13		QGUG1311BA	Button	1
14		QGUG1306AA	Button	1
○ 15		QGUG1308BA	Button	1
16		QGUG1303AA	Button	1
○ 17		QGUG1308DA	Button	1
○ 18		QGUG1308CA	Button	1
○ 19		QGUG1309DA	Button	1
○ 20		QGUG1313AA	Button	1
○ 21		QGUG1309CA	Button	1
22		QGUG1305AA	Button	1
23		QGUG1311CA	Button	1
24		QGUG1310AA	Button	1
○ 25		QGUG1304CA	Button	1
○ 26		QGUG1300BA	Button	1
○ 27		QGUG1312BA	Button	1
28		QLZG005A	Core, M MC EP XL	1
○ 29	PS	QKSGK011AA	Bottom Case	1
30		QMGG019AA	Rubber Cushion	4
○ 31		QEUGTQW11DZ	Flat Cable	1
○ 32		QMRG5077AA	Sponge	2
33		QAUG006AA	DDR Drive unit	1
34		SBCG1660A	Button, Power Switch	1
○ 35		QSCG077A	Shield	1

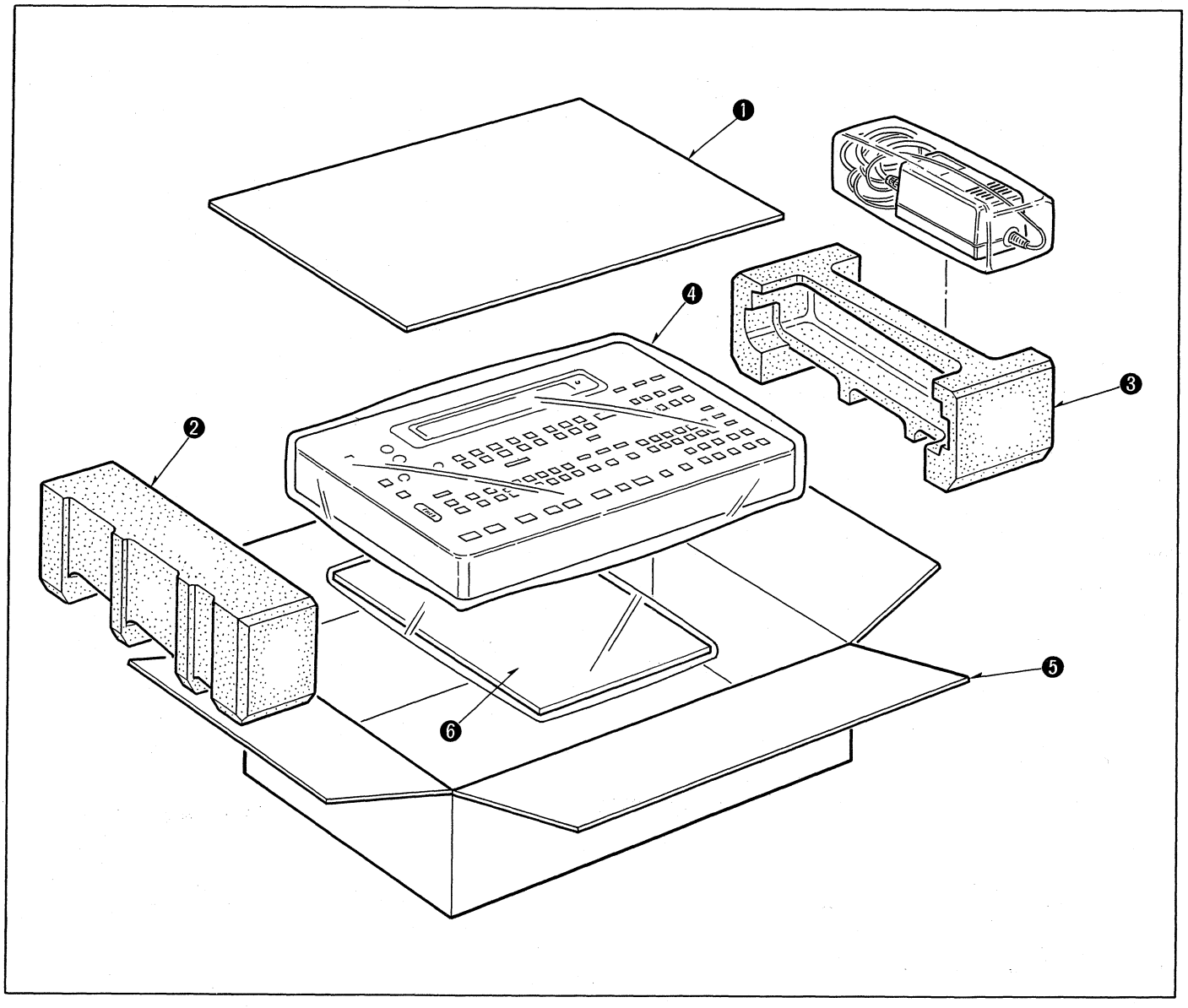
Ref. No.	Part No.	Description	P/S
SCREWS & WASHERS			
N1	XTW3+10Q	Screw	10
N2	XTB3+14JFZ	Screw	13
N3	XYN3+F8FZ	Screw with Washer	4

CABINET PARTS LOCATION



III-5 III-6

PACKING



■ PACKING PARTS

Ref. No.	Part No.	Description	P/S
PACKING PARTS			
○ 1	QPNG0481AA	Card Board	1
○ 2 PS	QPNG0479AA	Pad	1
○ 3 PS	QPNG0480AA	Pad	1
4	QPFG003AA	Polyethylene Bag	1
○ 5	QPGG0286AA	Carton	1
OPERATING INSTRUCTION MANUAL			
○ 6	QQFGAC1200AA	Operating Instruction Manual, EN	1
○ 6-1	QQTG0304A	DANSK	1
○ 6-2	QQTG0305A	ENGLISH	1
○ 6	QQFGAC1200BA	Operating Instruction Manual, MI	1
○ 6-1	QQTG0306A	ENGLISH	1
○ 6	QQFGAC1200CA	Operating Instruction Manual, MC	1
○ 6-1	QQTG0305A	ENGLISH	1
○ 6-2	QQTG0307A	FRANCAIS	1

Ref. No.	Part No.	Description	P/S
○ 6	QQFGAC1200DA	Operating Instruction Manual, XS XL XR EK	1
○ 6-1	QQTG0305A	ENGLISH	1
○ 6	QQFGAC1200EA	Operating Instruction Manual, EA EZ	1
○ 6-1	QQTG0308A	DEUTSCH	1
○ 6	QQFGAC1200FA	Operating Instruction Manual, EW	1
○ 6-1	QQTG0307A	FRANCAIS	1
○ 6-2	QQTG0308A	DEUTSCH	1
○ 6-3	QQTG0309A	ITALIANO	1
○ 6	QQFGAC1200GA	Operating Instruction Manual, EF	1
○ 6-1	QQTG0307A	FRANCAIS	1
○ 6-2	QQTG0309A	ITALIANO	1
○ 6	QQFGAC1200HA	Operating Instruction Manual, EH	1
○ 6-1	QQTG0310A	NERDERLANDS	1
○ 6-2	QQTG0307A	FRANCAIS	1
○ 6-3	QQTG0308A	DEUTSCH	1